ANNUAL SURVEY OF LARGE PENSION FUNDS AND PUBLIC PENSION RESERVE FUNDS

REPORT ON PENSION FUNDS' LONG-TERM INVESTMENTS

2019

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FOREWORD

G20 leaders have identified the facilitation of long-term financing through the capital markets as a priority for helping to achieve targets for investment, growth and employment. This survey sheds light on the role that large institutional investors can play in providing a source of stable long-term capital.

This survey report is the sixth since the data collection exercise was first established in 2011. The scope of this report covers more than 100 public and private pension funds from 46 countries. Brazil, India, Indonesia, Malaysia, Nigeria, the Russian Federation, and South Africa are amongst the non-OECD countries included in the survey report.

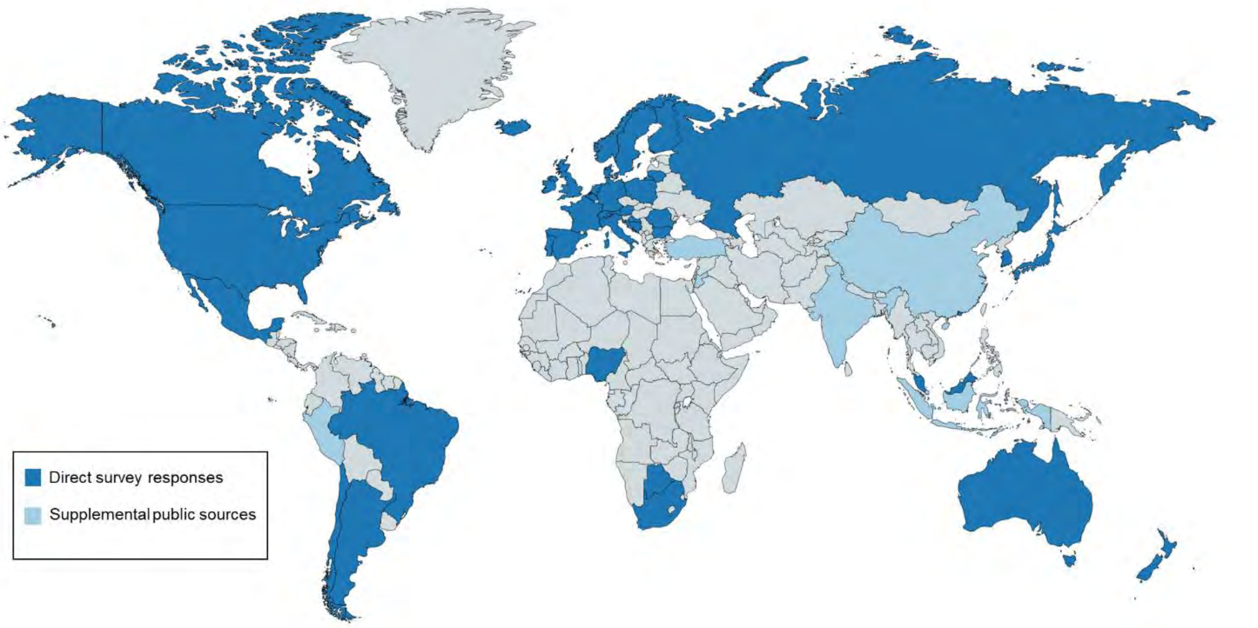
This survey is based on a qualitative and quantitative questionnaire sent directly to large pension funds (LPFs) and public pension reserve funds (PPRFs). It helps to provide detailed investment information and insights which complement the aggregated data on portfolio investments gathered by the OECD at a national level through the Global Pension Statistics and Global Insurance Statistics projects. The 2019 edition includes:

- a summary of key trends observed in the investment portfolios of LPFs and PPRFs
- an in-depth analysis of LPF and PPRF investment programmes
- an analysis of infrastructure investment by LPFs and PPRFs
- an analysis of ESG investment by LPFs and PPRFs

This survey is part of the OECD Project on Institutional Investors and Long-term Investment and the work of the G20/OECD Task Force on Long-term Investment. It has been prepared by Joel Paula with contributions from Lena Schreiner and Gary Mills, all of the OECD Insurance, Private Pensions, and Financial Markets Division, Directorate for Financial and Enterprise Affairs.

This report was made possible by the contributions of pension funds and public pension reserve funds. The OECD gratefully acknowledges the efforts of the participants in providing extensive data.

Global survey coverage representing USD 12.4 trillion in assets under management



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ABOUT THE SURVEY

Traditionally, institutional investors have been seen as sources of long-term capital with investment portfolios built around two main asset classes (bonds and equities) and an investment horizon tied to the often long-term nature of their liabilities. Institutional investors have progressively diversified portfolios by adding allocations to alternative investments such as private equity, real estate, infrastructure and hedge funds.[1] However, despite the increasing interest in alternative investments, official data on pension fund investment in alternatives – and in particular infrastructure – is scarce. National statistical agencies do not currently collect separate data on these investments and the different forms available to investors to gain exposure to these asset classes means that information is often buried under different headings.[2]

This survey by contrast collects data on individual pension funds that are amongst the largest in their respective economies, and comparatively, amongst the largest in the world.[3] The data complement insights and detailed administrative data gathered at the national level.[4] This edition marks the sixth year of the survey and, the scope of this report is being expanded to cover selected OECD countries, IOPS[5] countries, G20 member countries and APEC economies, based on data gathered in 2017.

The results highlight the depth and breadth of institutional investors, elucidating the importance of long-term capital and the role that pension savings can play in an economy. While the report covers the general state of long-term investment, which will be of prime value to the ultimate investors, it can also be used to inform regulators and other policy makers to help them better understand the operation of institutional investors in different countries. By analysing pools of long-term savings in domestic markets, and also in foreign markets where funds may invest a large portion of assets outside of their home country, policy makers can gain insights into the drivers behind asset allocation decisions and the conditions needed to attract long-term savings.

The survey reviews the trends in assets and asset allocation of 125 large pension funds (LPFs) and public pension reserve funds (PPRFs),[6] which in total managed USD 12.4 trillion in assets in 2017, approximately one third of the total worldwide assets held by this class of institutional investor. Information was provided

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[1] As noted in the IOPS 'Good Practices in the Risk Management of Alternative Investments by Pension Funds', there is no precise definition of alternative investments. The nature of alternative investments is dynamic and ever-evolving, and closely linked to the development of financial markets. While there is no official definition of alternative assets, the term is usually applied to instruments other than listed equities, bonds, and cash. For the purposes of this survey, "alternative" investments comprise the following types of investments: hedge funds, private equity, real estate, infrastructure, commodities and "other" (other includes: timber and currency/interest rate overlays).

[2] For example, infrastructure investment may not occupy a separate allocation, appearing instead as part of private equity or real estate allocations. Pension fund investment in listed infrastructure vehicles is reported by national statistics agencies as national or foreign equities and infrastructure lending is reported as fixed income, while direct investment or participation in private equity vehicles is sometimes reported within the category "other".

[3] The survey does not utilise a strict definition of a large pension fund, but seeks to capture trends by looking at the largest investors in the world, compared on an absolute basis, followed by the largest investors within specific countries.

[4] See OECD Global Pension Statistics, www.oecd.org/ pensions/globalpensionstatistics.htm.

[5] IOPS: International Organisation of Pension Supervisors, www.iopsweb.org/.

[6] PPRFs are reserves/buffers to support otherwise PAYG financed public pension systems as opposed to pension funds which support funded pension plans in both public and private sectors. See Annex for definitions of the types of sovereign and public pension reserve funds. The survey included some SWFs such as Norway's Government Pension Fund – Global that have at least a partial pension objective.

through the survey for 99 out of the 125 investors. Data for the 26 remaining funds came from publicly available sources.

Ninety-three retirement schemes comprise the section on LPFs, consisting of a mix of defined benefit (DB) and defined contribution (DC) pension plans (mainly public sector funds, but also corporate funds) that together total USD 4.9 trillion in assets under management. Data for 76 schemes were provided by the large pension funds directly, the other 17 coming from publicly available sources. This information is presented in combination with the PPRF survey carried out at the same time. Twenty-three PPRFs or Sovereign Wealth Funds (SWFs) with a pension focus completed the survey, 9 were added from publicly available sources, for a total of 32 PPRFs. Total amounts of PPRF assets were equivalent to USD 7.5 trillion at the end of 2017 for the countries in which we received or looked for data.

Altogether, data was compiled from funds representing 46 countries around the world including non-OECD countries such as Brazil, China, India, Malaysia, Nigeria, the Russian Federation, and South Africa.

The survey report is divided into four sections. The Executive Summary summarises key trends observed in the investment portfolios of LPFs and PPRFs; Part A – Portfolio Analysis focuses on pension fund size and growth, asset allocation, international exposure, and investment performance, and is divided into two sets of investors: large pension funds and public pension reserve funds. Part B – Infrastructure Investment focuses on capital flows in infrastructure, investment structures, sector and geographies. This part of the report – the infrastructure investment survey – includes data from 49 funds[7] out of the total 99 funds that returned completed questionnaires. Part C – ESG and Infrastructure focuses on green investment and social impact investment.

[7] Forty-nine funds reported their exposure to infrastructure investments. The remaining 50 funds did not report their infrastructure investments or did not have infrastructure investments to report.

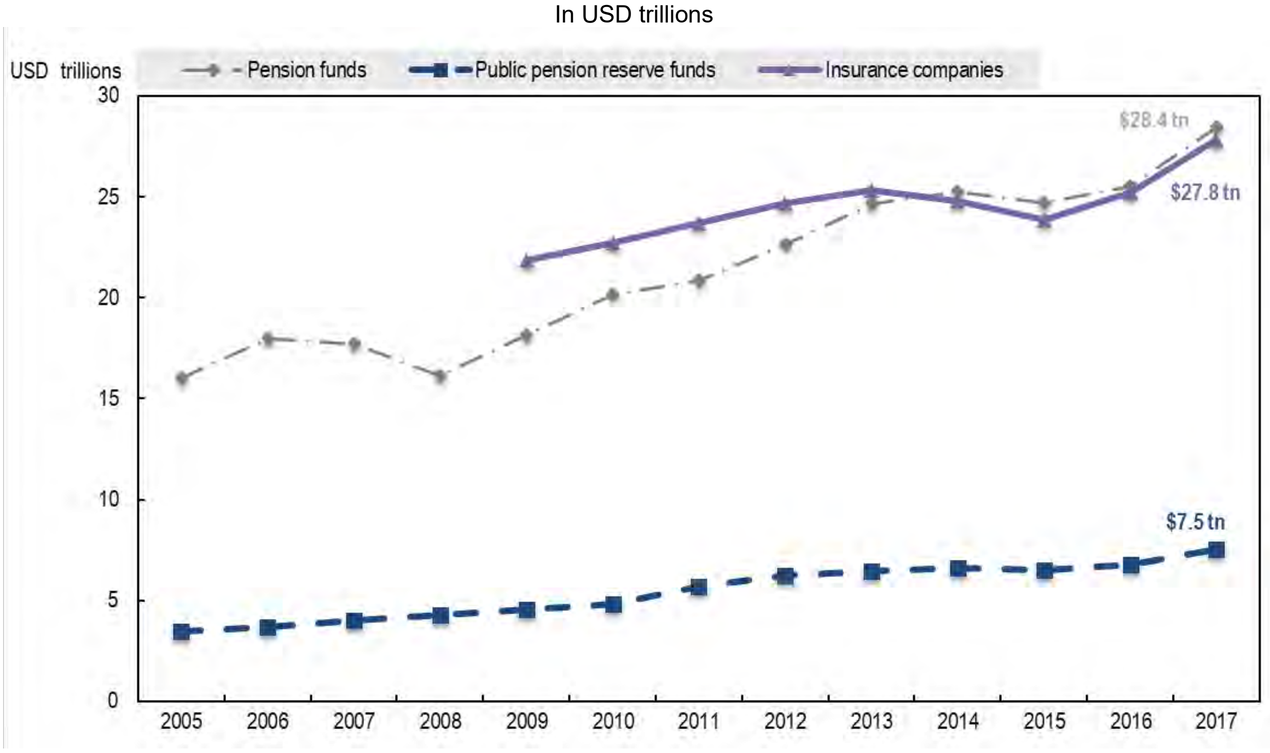
INTRODUCTION

Asset levels are growing in key institutional investor segments

In 2017, major asset owners in the OECD area, comprising pension funds, insurance companies, and public pension reserve funds, who together represent key segments of the institutional investment market, held USD 63.7 trillion in assets (Figure 1). In that same year, the combined GDP of OECD countries was USD 51.0 trillion – asset owners together totalled 125% of the OECD region's GDP. Growth has been strong in the pensions segment, where assets increased USD 10.7 trillion over the past ten years.

Figure 13. Assets in pension funds, insurance companies, and PPRFs in the OECD area, 2005-2017

In USD trillions



Note: Book reserves are not included in this chart. Total investments by pension funds are used as a proxy for total assets and may be a low estimate. Assets of insurance companies include assets of direct insurers and reinsurers. Insurance totals for Canada for 2016 and 2017 are estimated based on 2015 values; insurance totals for Korea for 2017 are estimated based on 2016 values. Total assets for PPRFs include some non-OECD countries.

For public pension reserve funds, data include Argentina's Sustainability Guarantee Fund (2011-2017); Australia's Future Fund; Belgium's Zilverfonds (2008-2016); Canada Pension Plan Investment Board; Quebec Pension Plan, Canada (2011-2017); Chile's Pension Reserve Fund (2010-2017); China's National Social Security Fund (2011-2017); Valtion Eläkerahasto, Finland (2013-2017); France's Pension Reserve Fund, and AGIRC-ARRCO; Sustainability Fund, Germany (2015-2017); Employees' Provident Fund Organisation, India (2012-2017); Ireland 's National Pensions Reserve Fund (2005-2013); Japan's Government Pension Investment Fund; Social Security Investment Fund, Jordan (2016-2017); Korea's National Pension Service; Fonds de Compensation Commun au Régime Générale de Pension, Luxembourg (2015-2017); New Zealand Superannuation Fund; Government Pension Fund – Norway; Government Pension Fund - Global - Norway (2011-2017); Poland's Demographic Reserve Fund; Portugal's Social Security Financial Stabilisation Fund; National Wealth Fund, Russian Federation (2011-2017); Spain's Social Security Reserve Fund; Sweden's AP1-AP4 and AP6; United States' Social Security Trust Fund.

Source: OECD calculations based on OECD Global Pension Statistics, OECD Global Insurance Statistics, and OECD estimates.

This survey report is comprised of a sample population of large pension funds (LPFs) in OECD and non-OECD countries. The total amount of assets under management for the LPFs for which data was received (through a detailed questionnaire) or obtained (from public sources) was USD 4.9 trillion at the end of 2017. Total assets of this population increased by a robust 10.3% on average between 2016 and 2017 (through investment returns and/or fund flows). Trailing five-year real annualised returns were positive for the majority of funds, where history was available, with some funds reporting exceptionally strong returns over the past five years.

Sovereign wealth funds (SWFs) and public pension reserve funds (PPRFs) are becoming major players in international financial markets. Total amounts of PPRF assets were equivalent to USD 7.5 trillion at the end of 2017 for the countries in which data was received or obtained. PPRF assets increased 6.9% on average between 2016 and 2017 (due to investment returns and/or fund flows). Trailing five-year real annualised returns were positive for all funds, where history was available. Funds in New Zealand and Canada reported exceptionally strong returns over the past five years.

This growth in assets is likely to continue in OECD countries, especially in countries where mandatory retirement systems or where private pensions and insurance markets are still small in relation to the size of their economies. For example, in Korea, pension fund assets grew from USD 76.2 billion in 2007 to 485.9 billion in 2017.[8] Developing economies generally face an even greater opportunity to develop their institutional investor sectors as, with few exceptions, their financial systems are largely bank-based. Nigeria's pension market grew from USD 6.9 billion in 2007 to USD 24.6 billion in 2017; China's from USD 20.8 billion to USD 197.8 billion over the same time period. Whether such growth continues across all countries will depend on some key policy decisions, such as the establishment of a national pension system with a funded component which is nowadays a common feature in most OECD countries, and becoming more common in non-OECD countries.[9]

Emerging economies are also home to some of the largest LPFs and PPRFs in the world. For example the survey included large pension funds in six major non-OECD countries: Argentina, Brazil, Malaysia, Nigeria, the Russian Federation, and South Africa. South Africa's GEPF at USD 152.8 billion and Brazil's Previ at USD 56.7 billion stood out as the largest funds in their respective continents. Malaysia's Employees' Provident Fund, with assets under management of USD 199.5 billion is amongst the largest investors in the world.

Ongoing reform efforts, demographic trends, and economic conditions are shaping pension markets

Through ongoing pension reforms, governments have begun to emphasise contributory pension schemes to build assets in order to finance future retirement income. This has enabled much of the growth observed in pension fund assets under management. In developing countries, governments are establishing mandatory and/or contributory retirement systems.

As described in the most recent OECD Pensions at a Glance,[10] a number of challenges are facing global pension systems. Aging populations, for instance, are puting additional pressures on pensions as the ratio of workers to retirees declines. In 1980, there were 2 people older than 65 years for every 10 people of working age in OECD countries. That number will have increased to slightly over 3 in 2020, and is projected to reach almost 6 by 2060. Despite improved economic conditions since the crisis, low interest rates persist, which increase discounted pension liabilities and limit future return on assets, making it more difficult to fund future benefits. Clearly pension policy plays an important role in providing financially sustainable levels of

[8] For country level statistics, see Pension Markets in Focus, http://www.oecd.org/daf/fin/private-pensions/pensionmarketsinfocus.htm

[9] However, owing to rising public debt, some OECD countries such as Hungary and Poland have partially rolled back reforms that had established mandatory funded pension systems.

[10] OECD (2019) Pensions at a Glance, https://doi.org/10.1787/b6d3dcfc-en

pensions. In the context of this report, it is therefore important to recall the operating and regulatory environment of pension funds as these are major factors that can influence investment behaviours.

In this report, the long-term investment profiles of two major sectors, funded pension schemes [defined benefit (DB) and defined contribution (DC)] and reserve funds linked to public pay-as-you-go (PAYG) systems are analysed. This provides a picture, using microeconomic data, of two distinct pools of long-term savings.

The shift towards DC arrangements, where individuals bear investment and longevity risks, compared to DB arrangements, is an important trend to be highlighted, and has been observed across OECD and non-OECD countries. It is important to point out this distinction as asset allocation, for example, of a defined benefit fund may not always compare to that of a defined contribution plan, even if members of both plans have similar investment horizons, as the management of investment decisions resides with different individuals (DB plans are professionally managed, whereas DC plan investment choices reside with individual members). Additionally, the sponsor type (corporate, multiemployer, public) - who may be subject to different regulatory environments - may influence the operating environment and characteristics of funds.

Differing regulations for DB plans compared to DC plans will also influence the operating environment and investment profiles of funds. For example, some countries have liquidity requirements in place for DC plans which may limit a plan’s ability to invest in illiquid assets. For policy makers looking to attract long-term financing, for example in infrastructure, the composition of local pension markets, regulations, and openness to foreign investment can influence how capital is invested.

EXECUTIVE SUMMARY

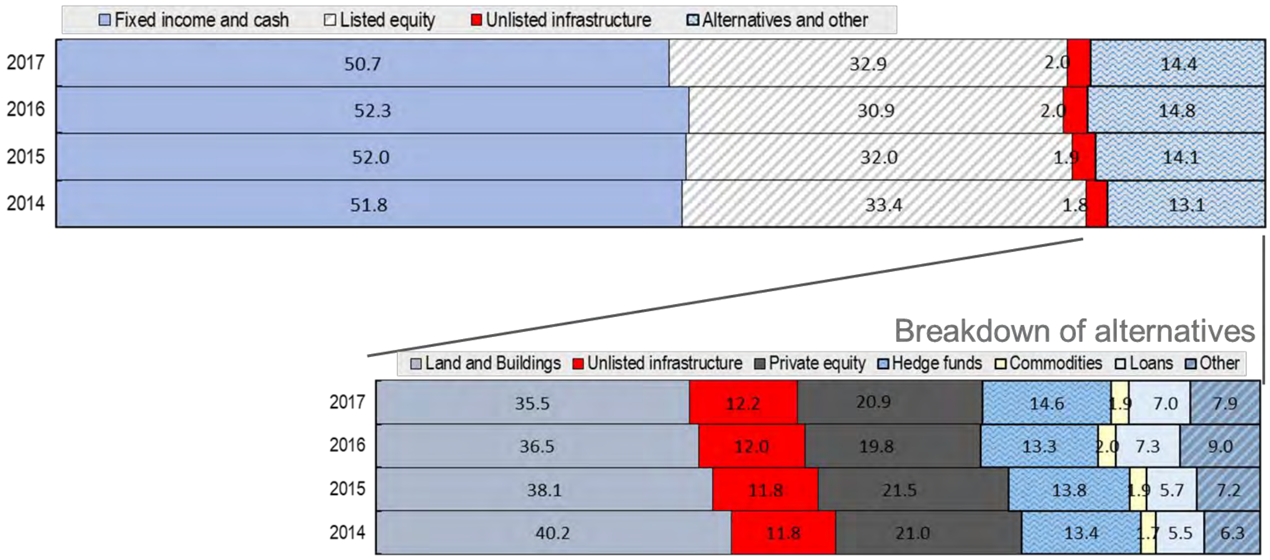
LPFs and PPRFs are increasing alternative investments

Perhaps the most salient trend in response to economic and financial market conditions, observed since the survey was first launched in 2011, has been the gradual increase in alternative investments amongst both LPFs and PPRFs. Historical asset allocation for a group of 35 LPFs over the past four years shows that allocations to alternatives (including infrastructure) increased from 14.8% of total assets in 2014 to 16.4% in 2017 (Figure 2).[11] Over this same time period, allocations to fixed income and cash decreased by 1.1 percentage points, and equity decreased by 0.5 percentage points. Shifting market values factor into changing asset allocation; however, given that equity markets have advanced through most of this time period, it appears that on average, funds have been reducing equity and fixed income exposure in favour of larger alternative investment allocations.

This trend was strongly observed in funds based in Australia, Canada, Denmark, Spain, and Switzerland. OTPP, based in Canada, reduced equity exposure from 21.0% of the total portfolio in 2014 to 14.5% in 2017; fixed income and cash also decreased from 40.3% to 30.5% over the same time period. For OTPP, total alternatives grew to 50.6% of the total portfolio at the end of 2017. Total allocation to alternatives for Australia's Hostplus increased from 32.4% in 2014 to 39.0% in 2017.

Figure 14. Historical average asset allocation of selected LPFs and alternative asset breakout, 2014-2017

Asset allocation as a percentage of total assets



Note: Values are a simple average invested in each asset category for all LPFs, from which actual asset allocation was available in the periods 2014-2017, independently of their size in terms of assets. A total of 35 LPFs submitted asset allocations over the four-year period ending in 2017, a subset of the total survey population. Asset allocation totals may not add to 100% due to rounding.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

[11] Thirty-five LPFs reported asset allocation over the past four years for this historical analysis, which is a subset of the 2017 total survey population.

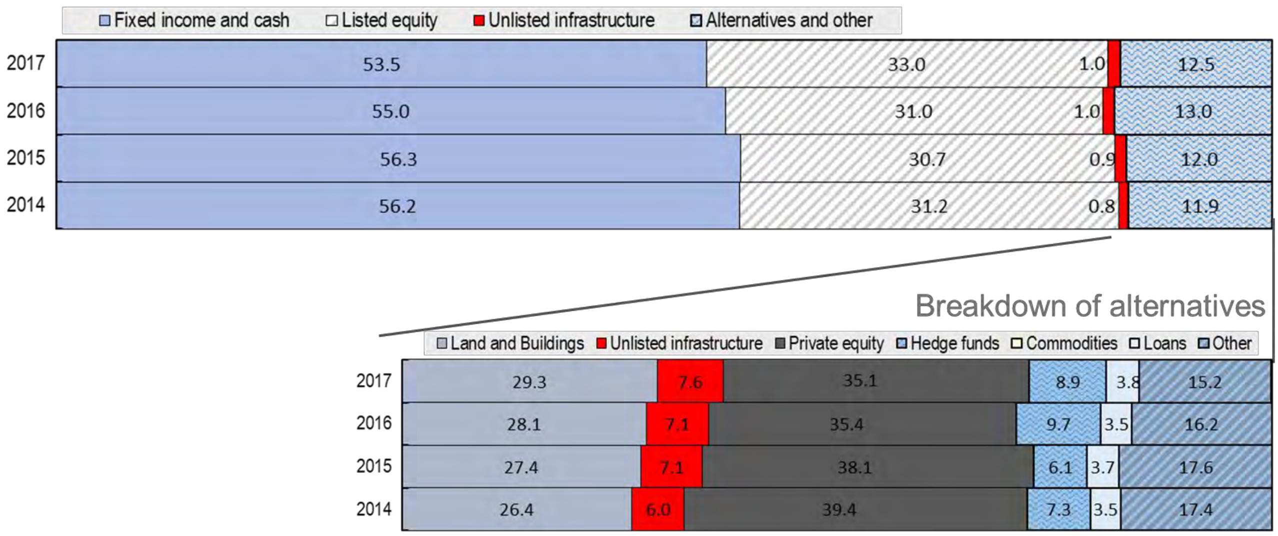
Looking at underlying trends within alternatives, LPFs have on average decreased allocations to land and buildings and increased allocations to infrastructure and hedge funds. Allocations to private equity over the past four years have been relatively flat, while loans have increased.

While the increasing trends in alternatives have been observed in many regions, it is not uniform across OECD and G20 countries. Pension funds in Brazil, for instance, reduced exposure to alternatives and increased fixed income and cash. Previ (Brazil) reduced its target to alternative investments and equities, and increased target allocations to fixed income. Funds in other countries cited regulatory barriers to investing in alternative asset classes.

Amongst PPRFs, those funds that are limited to investing only in fixed income have not changed asset allocation (funds based in the United States, Bulgaria, and Spain), and some funds (Portugal) have reduced risk due to fiscal pressures. Those funds that are able to maintain a long-term investment horizon, and that do not have short-term liquidity requirements or investment restrictions, have set long-term investment policy targets that include return-seeking assets such as equities and alternatives.

Figure 15. Historical average asset allocation of selected PPRFs and alternative asset breakout, 2014-2017

Asset allocation as a percentage of total assets



Note: Values are a simple average invested in each asset category for all PPRFs, from which actual asset allocation was available in the periods 2014-2017, independently of their size in terms of assets. A total of 20 PPRFs submitted asset allocations over the four-year period ending in 2017, a subset of the total survey population. Asset allocation totals may not add to 100% due to rounding.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

On average, allocations to alternatives (including infrastructure) increased from 12.7% of the total portfolio in 2014 to 13.5% in 2017; a slower pace than what was observed amongst LPFs (Figure 3).[12] Funds also on average increased allocations to equities by 1.8 percentage points, and decreased fixed income and cash by 2.7 percentage points. Trends within alternatives show that funds have on average increased allocations to land and buildings, infrastructure, and hedge funds. Private equity, which occupied the largest slice of alternatives portfolios, decreased compared to 2014.

[12] Twenty PPRFs reported asset allocation over the past four years for this historical analysis, which is a subset of the 2017 total survey population.

A few funds within the PPRF group are just beginning to ramp up new allocations, which is partly driving the trends observed in Figure 3. The GPIF in Japan migrated its portfolio to a new policy allocation of 50% equity and 50% fixed income, with up to 5% of the total portfolio invested in alternatives. The GPIF has been investing in internal resources to ramp up its alternative investment capabilities, which included the establishment of a Private Market Investment Department in March 2016. The fund is currently making some of its first investments in private equity and other alternatives.

CPPIB (Canada) increased allocations to alternatives from 29.5% of the total portfolio in 2014 to 43.5% in 2017. The Norwegian Government Pension Fund – Global began investing in land and buildings, growing its allocation to 4.5% of the total portfolio in 2017.

For most funds, diversification of investment portfolios includes foreign allocations

Funds have mostly invested across borders by diversifying equity and fixed income portfolios, but some also invest in foreign alternatives such as real estate, private equity and infrastructure. Emerging market investments are part of the foreign allocations of both LPFs and PPRFs, with emerging markets equities the most common.

The average LPF based in OECD countries included in this publication invested 58.6% of total assets in foreign markets, with the level of foreign investment varying amongst LPFs between 98.9% at the highest to 6.5% at the lowest. Funds based in Europe generally had higher amounts invested overseas, while funds based in the United States and Korea had lower amounts. Foreign diversification is mostly the result of regulation and investment policy; large funds based in countries with small domestic markets may be more inclined to invest abroad to diversify and increase the opportunity set. Funds based in non-OECD countries invested much lower amounts in foreign markets, just 9.8% on average. Thirteen LPFs based in non-OECD countries reported zero foreign exposure; most were based in Brazil.

Some PPRFs have diversified investments into foreign markets. With some major exceptions that reported zero foreign exposure (seven funds in total, based in Argentina, Bosnia & Herzegovina, Bulgaria, Mexico, Poland, Spain and the United States), other PPRFs had large exposures to foreign markets. Chile invested 100% of its portfolio abroad. Norway's Government Pension Fund Global also invested 100% of assets in foreign markets. Canada's CPPIB invested 84.2% in foreign markets, with over 46.2% of total assets invested in foreign alternative investments.

Infrastructure investment has been growing amongst pension funds, but overall levels remain low

Out of the total 99 funds that submitted a questionnaire, 49 funds reported investment in unlisted infrastructure equity. The funds in this group, covered in detail in Part B, allocated on average 3.9% of total assets to unlisted infrastructure equity - an overall moderate amount of investment. Allocations ranged from a high of 10.1% to a low of 0.1%. Indeed, funds in this group exhibit varied experience with some having well established investment programmes in infrastructure, and others recently adding allocations. Historical analysis of the total survey population (in the previous section) confirms that allocations have been growing amongst both LPFs and PPRFs.

When total assets under management are considered for the funds that returned questionnaires (i.e. 99 funds, USD 9.0 trillion), infrastructure investment in the form of unlisted equity and debt was USD 120.8 billion in 2017, representing 1.3% of the total assets under management.[13] The overall low levels of investment

[13] Figures may be understated given that for fixed income the majority of the funds do not report such details on their allocation and unlisted infrastructure equity is often included in other asset classes. Some funds also report their allocation to infrastructure through listed equity (i.e. infrastructure corporates), which for this survey, we have considered as indirect exposure.

observed in the total survey population are more likely in-line with the broader pension fund market as not all investors have established infrastructure investment allocations.

Some funds have reported challenges to increasing their infrastructure allocation. For instance, the Mandatory Provident Fund System in Hong Kong, China, which is a defined contribution system of privately managed funds, only permits investment in listed markets such as shares and bonds. AFP Cuprum, based in Chile, cited liquidity and regulatory constraints as barriers to investment. A fund in Romania also cited regulatory constraints as barriers to infrastructure investment. A fund in Nigeria cited sponsor constraints. One fund in Brazil indicated that high levels of risk prevented them from investing.

This seems to confirm the importance of barriers and disincentives which limit such investments and the relevance and need for policy makers to address them, and also the need for interventions in the form of risk mitigation and efficient risk allocation. High valuations of infrastructure assets may also constrain investment, as future return expectations may be depressed. While a number of funds are expressing greater interest in investing in greenfield assets, relatively few funds reported exposures to such assets, indicating that policies targeted at attracting investment in new projects is needed, along with improving business and financing models to cope with construction risk.

Potential unmet demand for infrastructure assets

There is potential capacity to expand institutional investment in infrastructure. Target allocations amongst the funds with dedicated exposure ranged on the low end from 1% to up to 20% of total assets. All but two funds that reported a separate target allocation to infrastructure were below targets at the end of 2017 (see Table 6). Nineteen funds that do not currently invest in infrastructure indicated that they planned to open allocations in the future, including funds based in Croatia, Lithuania, Sweden, and the United States. The Pension Reserve Fund of the Republic of Srpska reported a new 5.0% allocation to infrastructure and real estate, which was not yet funded at the time of this data collection. LACERA, based in the United States, also indicated plans to open an allocation.

Low investment levels in emerging markets

Twenty-two funds reported domestic and foreign allocations in their unlisted infrastructure equity portfolio – this group consists mostly of large funds based in OECD countries that have an established track record and institutional knowledge regarding infrastructure investment. Most funds in the survey did not report this level of detail, but the results from this group of investors, which is fairly representative of large and sophisticated investors, shows low or no investment in emerging markets by most funds.

Most of these 22 funds invested a significant portion of their infrastructure portfolio outside of their domestic market, with the exception of funds based in Australia, Brazil, Switzerland and the United Kingdom. For those funds that reported large foreign exposures, it was mostly in other OECD countries, particularly in the European Union and North America.

No funds reported exposure to infrastructure investments in Africa or in the Middle East. The New Zealand Superannuation Fund reported investments in Asia excluding Japan and Korea. Funds based in Canada, particularly CPPIB, reported allocations in Latin America and Asia excluding Japan and Korea. CPPIB maintains global offices, including in São Paulo, Mumbai, and Hong Kong, China.

Sustainability is a major theme amongst investors

In Part C of this report, 37 funds reported allocations to "green" investments, broadly defined as investments that meet certain environmental criteria. The results reveal that investors are taking different approaches to sustainability in their investment process and portfolio allocations, with some reporting equities, fixed income (green bonds), and alternative assets as meeting environmental criteria. A noteworthy trend amongst the funds that reported green investments was a general increase in the amount of pension funds that invest in green bonds (24 in total).

An increasing number of funds are going beyond ESG and building investment strategy around other goals, such as evaluating climate change risk in investment portfolios and improving portfolio climate resiliency. Some funds have moved to align their investment activities with broader environmental or development objectives such as the United Nations Sustainable Development Goals (SDGs). ABP, based in the Netherlands, reported on the importance of the SDGs in their investment framework, and has created a methodology to identify, measure, and report on sustainable development investments (SDIs), which it defines as investment opportunities that contribute to the achievement of the SDGs.

Fifteen funds reported social impact investments, which ranged from microfinance and venture capital/private equity with a targeted social development outcome to social/affordable housing and social impact bonds. Social impact investments, broadly, are investments with a desired development or positive social impact that could represent human rights, health, safety, education, or general wellbeing.

SURVEY OF LARGE PENSION FUNDS AND PUBLIC PENSION RESERVE FUNDS

PART A1 – LARGE PENSION FUND INVESTMENT PORTFOLIOS

Large pension fund size

The total amount of assets under management for the large pension funds (LPFs) covered by the survey was approximately USD 4.9 trillion at the end of 2017 (Table 1). Within the OECD countries for which the OECD received data, the Netherlands has two of the largest funds, ABP at USD 545.5 billion and PFZW at USD 236.5 billion. Amongst the largest are three funds based in the United States: CalPERS at USD 326.5 billion, CalSTRS at USD 208.7 billion, and the New York State and Local Retirement System at USD 197.6 billion. South Africa's GEPF at USD 152.8 billion and Singapore's Central Provident Fund at USD 268.4 billion also ranked high in the list. This year's survey includes responses from 76 funds, the largest survey population since the first annual survey conducted in 2011, representing approximately 30 countries in the OECD and outside the OECD, complemented by information collected from publicly available reports for 17 additional funds.

Table 1 also shows large selected pension funds in eight major non-OECD countries and jurisdictions: Brazil, Hong Kong (China), Indonesia, Malaysia, Nigeria, the Russian Federation, Singapore, and South Africa. The Employees' Provident Fund of Malaysia is the largest pool of retirement savings in the country, at USD 199.5 billion, and amongst the largest institutional investors in Asia.

Total assets under management, measured in local currency, increased by a robust 10.3% (nominal) on average between 2016 and 2017 (through investment returns and/or fund flows). Funds in many countries posted exceptionally strong increases, particularly in Hong Kong (China), Canada, Australia, and Nigeria. Funds in Australia grew strongly in 2017: Hostplus grew by 31.4%, AustralianSuper by 19.5%, and CBUS by 18.4%. Some Funds in Europe also increased by sizeable amounts. Sweden's AP7 increased 22.2%, the BBC Pension Scheme, based in the United Kingdom, increased 22.7%. In all, 17 funds showed an increase in assets greater than 15.0%. Just two funds showed a decrease in assets in 2017. Funds in most regions were buoyed by good investment returns over the period.

In terms of total assets relative to the national economy, Singapore's Central Provident Fund had the highest ratio at 80.2% of GDP, followed by ABP at 61.6% (which with PFZW represented 88.3% of the Dutch GDP), Malaysia's Employees' Provident Fund at 59.9%, South Africa's GEPF at 40.5%, and Denmark's ATP at 35.3%. The weighted average of LPF assets accounted for 21.2% of the national GDP in the countries covered in this publication.

Table 9. Total assets of selected LPFs in 2017

Country head office	Name of the fund or institution	Total investments or assets		
		USD bn.	% of GDP	% increase (compared to the previous year)
Australia	AustralianSuper	101.2	7.2	19.5
Australia	CBUS	33.9	2.4	18.4
Australia	Health Employees Superannuation Trust Australia (2,3)	31.1	2.3	15.5
Australia	Hostplus Superannuation fund	22.6	1.6	31.4
Australia	Qsuper (2,3)	72.3	5.3	7.2
Australia	UniSuper Management Pty Ltd	48.7	3.5	11.7
Austria	APK Pensionskasse	5.6	1.3	7.1
Austria	Valida Pension	6.7	1.5	7.0
Austria	VBV Pensionskasse	7.9	1.8	12.7
Botswana	Botswana Public Officers Pension Fund	5.9	32.5	6.4
Brazil	Banesprev	5.0	0.3	7.4
Brazil	FAPES - BNDES	3.2	0.2	9.2
Brazil	FORLUZ	4.6	0.2	4.1
Brazil	Fundação CESP	8.3	0.4	5.6
Brazil	Fundação Petrobras de Seguridade Social	21.7	1.1	4.1
Brazil	Fundação Sistel de Seguridade Social	5.1	0.3	3.1
Brazil	Previ	56.7	2.9	11.9
Brazil	Real Grendaza	4.6	0.2	6.2
Brazil	Valia	6.7	0.3	5.2
Canada	Alberta Investment Management Company (AIMCO)	82.6	4.8	8.2
Canada	British Columbia Investment Management Corporation (2,4)	101.9	6.6	11.2
Canada	Local Authorities Pension Plan (LAPP)	34.0	2.0	13.2
Canada	OMERS (2)	76.8	4.5	11.6
Canada	OTPP	147.7	8.6	7.7
Chile	AFP Cuprum	41.1	14.0	6.3
Croatia	Allianz ZB Obligatory Pension Fund	5.4	9.2	6.2
Croatia	Erste Plavi	2.2	3.8	17.0
Croatia	PBZ CO	2.3	4.0	8.3
Croatia	Raiffeisen Mandatory Pension Funds	4.5	7.8	10.5
Denmark	ATP (2)	123.8	35.3	1.2
Denmark	PensionDanmark	34.4	9.8	10.8
Denmark	PFA Pension	76.9	20.5	7.1
Finland	KEVA	62.2	23.2	6.9
Finland	Varma Mutual Pension Insurance Company	54.3	20.2	7.2
France	ERAFP (2)	28.3	1.0	9.8
Germany	BASF Pensionskasse	11.4	0.3	10.1
Germany	Bayer-Pensionskasse (2)	10.3	0.3	2.8
Hong Kong, China	Mandatory Pension Fund Schemes (5)	107.9	31.7	30.5
Iceland	Birta	3.1	12.5	8.7
Iceland	Gildi Pension Fund	4.9	19.7	9.5
Iceland	Lifeyrissjodur Starfsmanna Rikisins	7.9	31.4	10.7
Iceland	Pension Fund of Commerce	6.4	25.4	10.4
Ireland	Bank of Ireland	6.3	1.8	-2.1
Ireland	ESB	4.5	1.3	16.0
Indonesia	BPJS Ketenagakerjaan (2)	22.3	2.2	15.6
Italy	Cometa	13.1	0.6	6.0
Italy	FONCHIM	7.4	0.4	9.7
Italy	Fonte	4.4	0.2	9.3
Japan	Pension Fund Association	109.1	2.3	4.1
Korea	Samsung Life	13.7	0.8	8.9
Lithuania	Swedbank Pensija 2	0.3	0.6	7.6
Lithuania	Swedbank Pensija 3	0.5	1.0	16.2
Lithuania	Swedbank Pensija 4	0.2	0.5	21.8
Malaysia	Employees' Provident Fund	199.5	59.9	9.6

Netherlands	PFZW	236.5	26.7	6.4
Netherlands	PMT	83.4	9.4	1.9
Netherlands	Stichting Pensioenfonds ABP	545.5	61.6	8.3
Netherlands	Stichting Pensioenfonds van de Metalektro (PME)	55.9	6.3	4.2
Nigeria	AES Fund (6)	1.0	0.3	41.0
Nigeria	CPFA Fund (6)	1.8	0.5	27.5
Nigeria	RSA Fund (6)	6.8	1.8	..
Peru	AFP Integra (2)	19.0	8.8	12.9
Portugal	Banco BPI Pension Fund	1.8	0.8	16.2
Portugal	CGD Pensões (7)	3.2	1.4	6.1
Romania	Azt Viitorul Tau (8)	2.2	1.0	25.7
Romania	Raiffeisen Acumulare	0.0	0.0	12.3
Russian Federation	Future ("Buduschee")	4.9	0.3	11.0
Russian Federation	Lukoil - Garant	4.4	0.3	1.1
Russian Federation	Sberbank	8.6	0.5	33.6
Singapore	Central Provident Fund (2)	268.4	80.2	9.3
South Africa	GEPF	152.8	40.5	12.4
South Africa	Sentinel Retirement Fund (9)	3.6	0.9	1.9
Spain	Endesa	2.1	0.2	2.9
Spain	Fonditel (10)	3.9	0.3	-3.3
Spain	Santander	0.3	0.0	9.9
Sweden	Alecta	101.1	16.7	7.7
Sweden	AP7	51.1	7.4	22.2
Switzerland	Pensionskasse Post	17.4	2.4	6.6
Switzerland	Publica	40.4	5.6	5.2
Turkey	OYAK (2)	19.6	2.4	7.1
United Kingdom	BBC Pension Scheme(2,4)	19.7	0.8	22.7
United Kingdom	BT Pension Scheme (2,3)	64.0	2.5	7.0
United Kingdom	Railways Pension Scheme (2)	37.2	1.3	7.7
United Kingdom	RBS Group Pension Fund (2)	60.5	2.2	2.2
United Kingdom	USS (11)	87.1	3.0	6.5
United States	CalPERS (2,3)	326.5	1.7	9.3
United States	CalSTRS (2,3)	208.7	1.1	10.6
United States	Florida Retirement System Pension Plan (2,3)	154.4	0.8	8.7
United States	Los Angeles County Employees Retirement Association	55.6	0.3	12.2
United States	Massachusetts PRIM Board (2,3)	66.9	0.3	10.1
United States	New York State and Local Retirement System (2,4)	197.6	1.0	7.6
United States	State of Wisconsin Investment Board (2)	104.6	0.5	24.7
	EuroControl Pension Fund	1.9	n.d.	13.0
Total		**4,884.0**	**21.2**	**10.3**

"..” means not available

(1) Data correspond to all forms of investment with a value associated with a pension fund/plan. (2) Data for 2017 has been gathered from publicly available sources. (3) Data is as of June 30, 2017. (4) Data is as of March 31, 2017. (5) Assets reported by the Mandatory Pension Fund are aggregated from 36 member schemes. (6) In Nigeria, there are three types of pension schemes, namely, the Retirement Savings Account (RSA), which is contributory; the Closed Pension Funds; and the Approved Existing Schemes (AES). The largest pension fund from each of these three schemes has been selected. (7) Data cover the CGD Staff's Pension Fund. (8) Data refer to the largest pension plan managed by Azt Viitorul Tau. (9) Data refer only to the Pensioner Portfolio. (10) Data refer to Fonditel's biggest pension plan: Empleados de Telefónica de España. (11) Data is as of March 31, 2018.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs and publicly available reports.

LPF asset allocation

Figures 4 and 5 show LPF asset allocation grouped by OECD and non-OECD countries. The simple average portfolio for the LPFs based in the OECD shows that 45.6% of total assets were invested in fixed income and cash, 35.6% in equity, and 18.8% in alternatives/other investments in 2017. For LPFs in non-OECD countries, the simple average portfolio held 69.5% in fixed income and cash, 23.9% in equities, and 6.6% in alternatives/other investments.

The survey shows the asset allocation of both defined benefit and defined contribution pension funds. In OECD and non-OECD countries, a spectrum of fund profiles existed, from portfolios invested in predominately safer assets such as fixed income and cash, to portfolios with higher amounts of equities and investments in alternative asset classes.

Within the OECD, funds based in Korea, Italy, and Spain had higher allocations to fixed income and cash. Italy's Fonte invested 81.0% of assets in fixed income and cash, while other conservative portfolios Samsung Life (Korea) and Santander (Spain) invested 64.4% and 68.7%, respectively, in fixed income and cash. Publica, Switzerland's largest pension fund, invested 61.4% in fixed income and cash. AP7, based in Sweden, had the highest allocation to equity at 90.4%, followed by Swedbank Pensija 4, based in Lithuania, at 67.6%. Funds based in Australia and the United States had in general higher allocations to equities compared to funds based in other countries.

Figure 16. Asset allocation of selected LPFs based in OECD countries, 2017

As a percentage of total investment

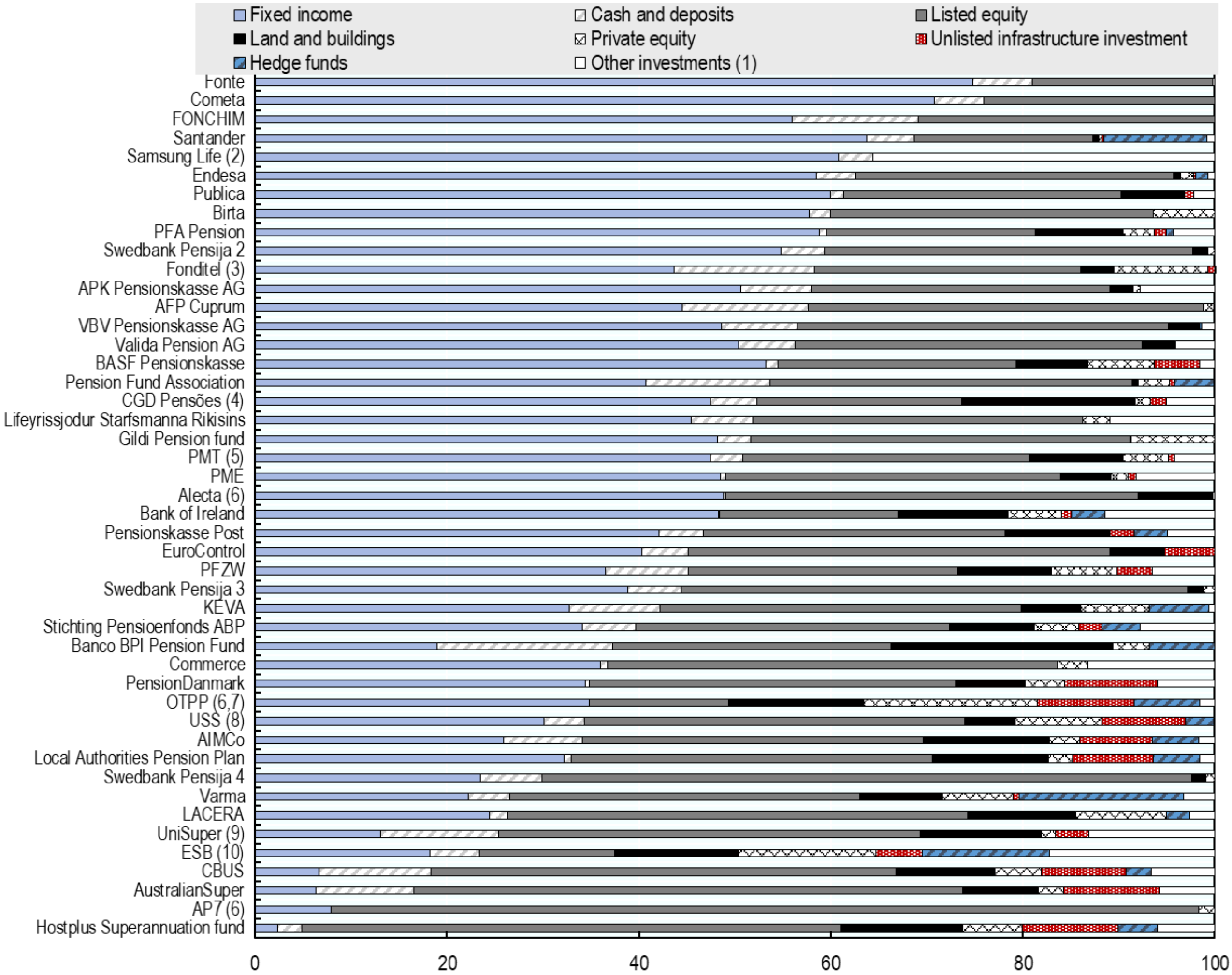
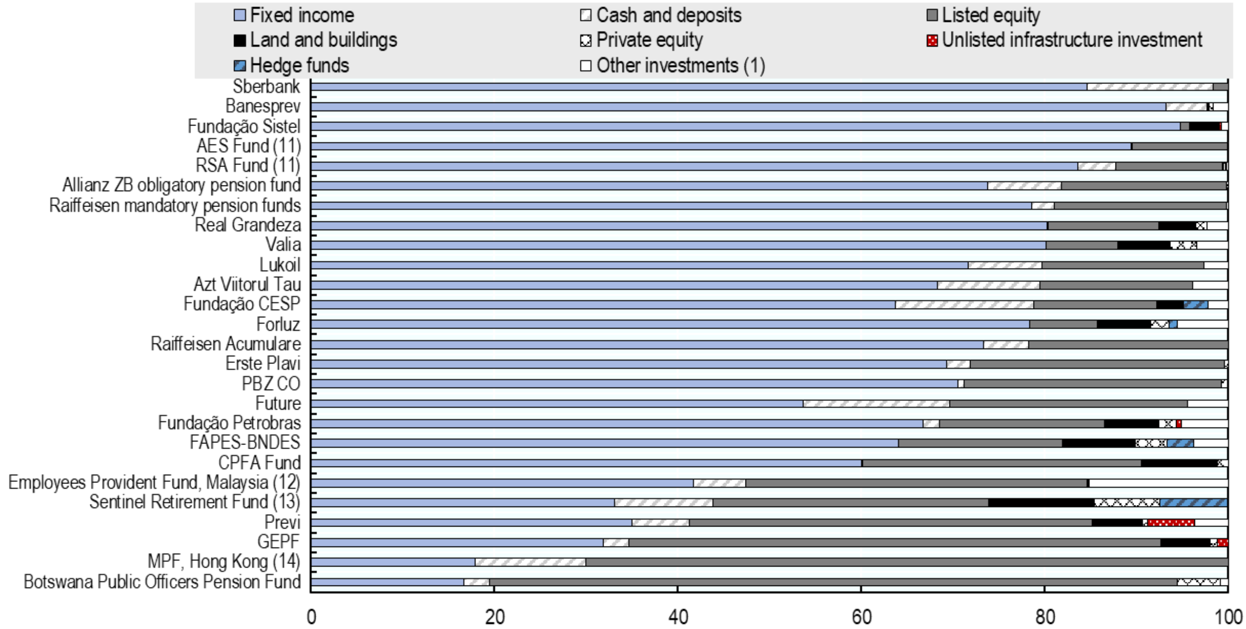


Figure 17. Asset allocation of selected LPFs based in non-OECD countries, 2017

As a percentage of total investment



(1) The "other" category includes loans, commodities, and other investments. (2) Loans comprised the majority of other investments. (3) Data refer to Fonditel's biggest pension plan: Empleados de Telefónica de España. (4) Data cover the CGD Staff's Pension Fund. (5) Other investments include micro finance. (6) Other investments and/or cash investments have been excluded from asset allocation calculations because they were negative in 2017. (7) Other investments include real estate debt, timberlands, and derivatives. (8) Data are as of March 31, 2018. (9) Breakdowns have been provided based on existing regulatory reporting categories. (10) Other assets include multi-asset funds. (11) Other investments include mutual funds. (12) Other investments include investment in subsidiaries, associates and joint ventures, financial assets at fair value through profit or loss, and unquoted equities. (13) Data refer to the Pensioner Portfolio. (14) Asset allocation reported by the Mandatory Pension Funds is aggregated from 36 member schemes.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

In non-OECD countries, portfolios were tilted toward safer assets. Two funds based in Brazil, Banesprev and Fundação Sistel, invested nearly all assets in fixed income and cash, along with Sberbank, based in the Russian Federation. Funds in Nigeria and Romania also had high allocations to fixed income and cash. MPF, Hong Kong, China, reported an allocation to fixed income and cash of 30.0%, amongst the lowest in non-OECD countries. The Employees' Provident Fund Malaysia invested 47.4% in fixed income and cash, and 37.3% in equities. This year's report includes nine funds based in Brazil; most of the funds were tilted towards safer assets, with the exception of Previ, which had a larger allocation to equities.

Alternative investments for LPFs include hedge funds, real estate, unlisted infrastructure, private equity, and other categories such as natural resources, loans, or commodities. The survey reveals that LPFs across regions have adopted alternative investments in varying degrees, but that alternatives' share of portfolios has been increasing (see executive summary for historical analysis of portfolio trends). Alternative investments were much more prevalent amongst pension funds based in OECD countries than non-OECD countries.

The Electricity Supply Board (ESB) Pension Fund, based in Ireland, invested 62.6% of total assets in alternative/other investments, the highest in the survey population; other assets, which comprised 17.2% of ESB's total portfolio included multi-asset portfolios. Canada's OTPP also invested a high amount in alternative/other investments, comprising 50.6% of total assets. In all, ten funds reported that over 30% of total assets were allocated to alternative/other investments. Notably, Australia's Hostplus reported 39.0%

allocated to alternatives/other, and Finland's Varma reported 37.0%. Sentinel Retirement Fund, based in South Africa, had the highest allocation to alternatives/other investments amongst funds based in non-OECD countries at 26.1% of total assets, which included investment in land and buildings, private equity, and hedge funds. The Employees' Provident Fund, Malaysia, invested 5.4% of total assets in private equity at the end of 2017, along with 11.0% in loans. Twelve funds reported zero or de minimis (under one percent) exposure to alternative investments, including three funds based in Italy, and the MPF, Hong Kong, China.

Most funds reported exposure to land and buildings and private equity, making them the two largest components of alternative asset portfolios in the survey. Two Portuguese funds had high allocations to real estate: Banco BPI at 23.2% and CGD Pensões at 18.1%. OTPP, ESB, Fonditel, and LACERA had sizeable allocations to private equity at 18.1%, 14.3%, 9.8%, and 9.5%, respectively. Varma Mutual Pension Insurance Company, ESB, Santander, and the Sentinel Retirement Fund led the survey population in terms of hedge fund allocation with 17.2%, 13.2%, 10.6% and 7.4%, respectively.

As part of the alternative asset allocation, a number of funds also invested in infrastructure. The funds that reported infrastructure allocations as part of their total fund allocation represent those that most likely have a dedicated long-term strategic allocation to infrastructure. For instance, several funds in Brazil invest in infrastructure, however, this is not visible in Figure 5 as these investments have been classified as equity or private equity. Part B of this report provides a detailed analysis of infrastructure investment portfolios, with a more in-depth view as to how asset allocation is reported at the total fund level to better understand how pension funds are investing in infrastructure.

LPF foreign investment

To some extent, pension fund investment in foreign markets can be an indicator as to how well domestic capital markets are integrated with foreign markets (Figures 6 and 7). All large pension funds based in the OECD invested at least part of their portfolios in foreign markets, although absolute levels of foreign investment varied widely, between 98.9% at the highest to 6.5% at the lowest (Figure 6). The most common asset classes invested abroad were fixed income and equities. Funds based in Europe tended to have large overseas allocations to both traditional and alternative investments including funds in Ireland, Belgium, Austria, Germany, and Sweden. Sweden's AP7 invested a substantial amount of equities in foreign markets, 91.1% at the end of 2017. The Bank of Ireland Pension Fund invested nearly all assets in foreign markets, at 98.9%, much of which included alternative investments. Dutch pension funds ABP, PMT, and PME all invested large amounts of their portfolios in foreign markets. This may be related to the size of domestic markets (comparatively large funds based in countries with small domestic markets may be more inclined to invest in foreign financial markets). But in most instances, especially in less mature pension systems, foreign investment is first decided by regulatory policy (quantitative limits on foreign allocation), and then by individual fund policy.

Funds based in the United States, Australia, Korea, and Iceland reported more moderate exposures to foreign investments. Funds in the United States do not have regulatory constraints on foreign investments, yet their overseas allocations are much lower compared to European funds, perhaps as a result of domestic investment opportunities compared to foreign. Since pension liabilities are denominated in currencies where contributions are made and benefits are paid, foreign investments introduce currency exposures – these exposures may be hedged back to local currency by managers, or otherwise left unhedged. The availability and cost of foreign currency hedging instruments may also drive investment decisions in foreign markets. Out of funds based in OECD countries, the average fund allocated 58.6% abroad.

A number of funds invested in alternatives in foreign markets. Varma Mutual Insurance, based in Finland, invested 17.1% of the total portfolio in foreign hedge funds. Canada's OTPP invested 16.1% in foreign private equity. A number of funds invested in foreign unlisted infrastructure, including PensionDanmark at

7.8% of the total portfolio, AIMCo at 7.2%, Eurocontrol at 5.2%, and BASF Pensionskasse at 4.3%. See Part B for a detailed analysis of geographical dispersion of foreign infrastructure portfolios.

Figure 18. Foreign investment by asset class, selected LPFs based in OECD countries, 2017

As a percentage of total (i.e. domestic and foreign) investment

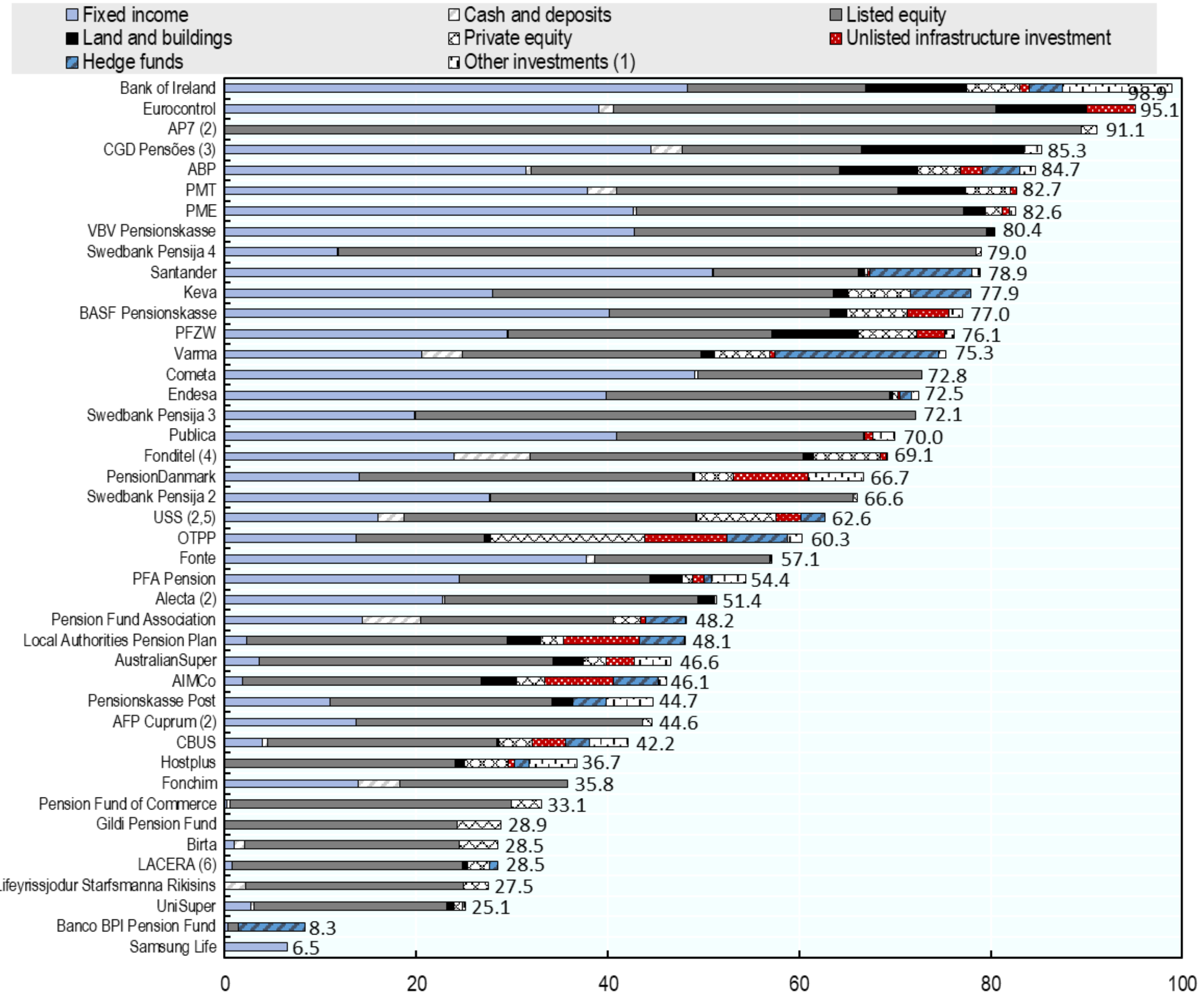
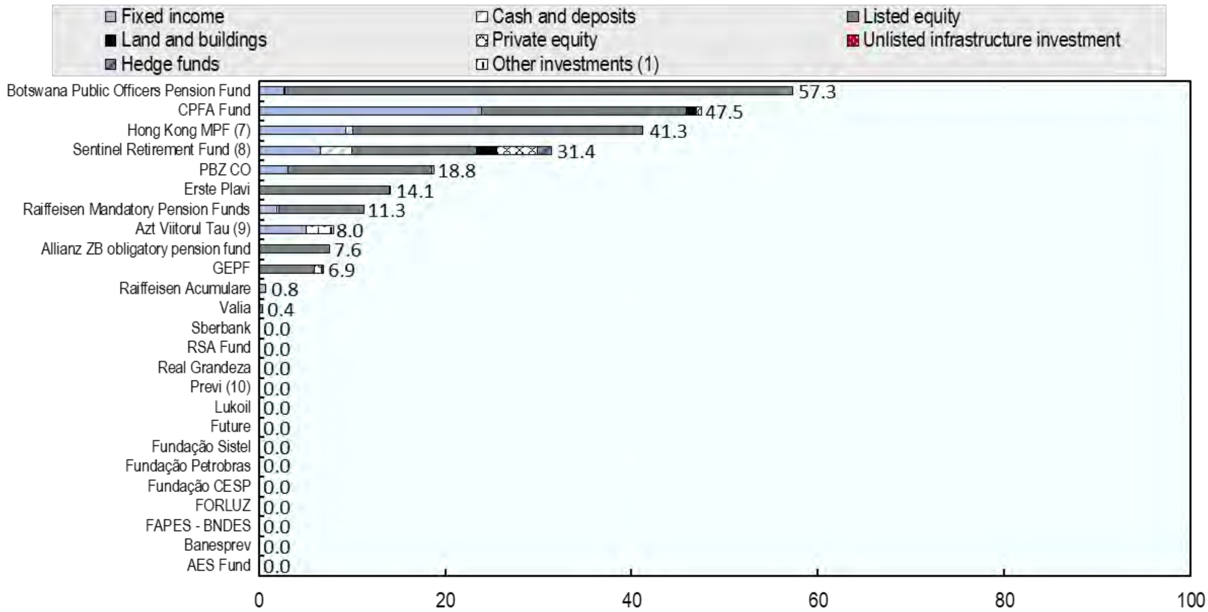


Figure 19. Foreign investment by asset class, selected LPFs based in non-OECD countries, 2017

As a percentage of total (i.e. domestic and foreign) investment



(1) The "other" category includes loans, commodities, and other investments. (2) Cash and deposits and/or other investments have been excluded because they were negative in foreign markets in 2017. (3) Data cover the CGD Staff's Pension Fund. (4) Data refer to Fonditel's biggest pension plan: Empleados de Telefónica de España. (5) Data are as of March 31 2018. (6) Foreign investments refer to investments outside Canada and the United States. (7) Asset allocation reported by the Mandatory Pension Fund Authority is aggregated from 36 member schemes. (8) Data refer only to the Pensioner Portfolio. (9) Data refer to the biggest pension plan managed by Azt Viitorul Tau. (10) Investments abroad occur through funds constituted in Brazil, hence they are considered as internally made.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

Some funds based in non-OECD countries invested assets abroad, although on average much less (the average fund invested 9.8% in foreign markets) compared to funds in OECD countries. The Botswana Public Officers' Pension Fund had the highest amount in the survey at 57.3%. Aggregated provident schemes in the MPF, Hong Kong, China, invested 41.3% overseas, mostly through equity markets but also in fixed income. CPFA fund, based in Nigeria, invested 47.5% in foreign markets. The Sentinel Retirement Fund, based in South Africa, allocated 4.4% to foreign private equity. Thirteen funds reported zero exposure to foreign markets including eight funds in Brazil and three funds based in the Russian Federation.

LPF performance – Investment rates of return in local currency

2017 delivered positive returns to virtually all LPFs surveyed, some of which experienced exceptionally strong results. Indeed, looking over the previous five years, a number of funds have benefitted from an extended period of strong returns. Global stock markets, particularly in the US where the S&P 500 posted its ninth year of positive returns at the end of 2017, contributed to these good results. Listed equities in Europe and in emerging markets also saw strong returns during the year. Optimism over global growth and relatively easy financial conditions propelled much of the strong returns observed. Currencies in emerging markets recovered from earlier selloffs, while the dollar remained strong against other developed market currencies.

Levels of foreign investment by pension funds could strongly influence reported returns in local currency. Differences in pension fund returns show a wide variation owing to heterogeneity in size, local market performance, levels of foreign investment, investor base (DB or DC), asset allocation and other factors such as levels of liability hedging and/or currency hedging observed in the sample of retirement schemes.

The average fund surveyed returned 8.0% nominal in 2017. Riskier assets delivered good returns in 2017, thus funds with larger allocations to equities may have outperformed more conservative portfolios. Funds based in Australia, Brazil, Nigeria, and Sweden posted exceptionally strong results. On a comparative basis, fund returns were lower in Italy, Lithuania, Russia and Spain. Trailing five-year real returns were positive for all funds where sufficient history was available.

Table 10. Nominal and real annual investment rates of return of selected LPFs, 2013-2017

In percentage

Country head office	Name of fund or institution	Nominal						Real					
		2013	2014	2015	2016	2017	*5-year annualised*	2013	2014	2015	2016	2017	*5-year annualised*
Australia	AustralianSuper (1)	17.5	8.9	7.7	8.2	13.6	*11.1*	14.4	7.0	6.1	6.8	11.4	*9.1*
Australia	CBUS	..	8.5	7.5	9.6	12.1	..	..	6.6	5.8	8.2	10.0	..
Australia	HESTA	17.4	7.8	6.5	..	..	..	14.3	6.0	4.7	..	..	..
Australia	Hostplus Superannuation fund	..	9.3	7.0	10.1	13.4	..	..	7.5	5.2	8.7	11.2	..
Australia	QSuper	..	12.5	6.2	..	..	..	..	10.6	4.5	..	..	..
Australia	UniSuper Management Pty Ltd	..	15.0	12.1	7.7	8.3	..	..	13.0	10.2	6.4	6.2	..
Austria	APK Pensionskasse	..	..	..	5.3	7.0	..	..	..	..	4.4	4.8	..
Austria	Valida Pension AG	..	..	..	4.1	5.8	..	..	..	..	3.2	3.6	..
Austria	VBV Pensionskasse	..	..	..	3.4	7.4	..	..	..	..	2.5	5.2	..
Botswana	Botswana Public Officers Pension	..	..	..	4.3	5.2	..	..	..	..	1.4	1.8	..
Brazil	Banesprev	..	..	..	17.5	10.5	..	..	..	..	8.0	6.8	..
Brazil	FAPES - BNDES	-3.0	7.7	7.7	18.0	14.0	*8.7*	-8.4	1.3	-1.2	8.5	10.2	*1.9*
Brazil	Forluz	..	..	..	12.3	9.1	..				3.3	5.5	..
Brazil	FUNCEF	6.9	4.4	2.8	..	..	..	0.9	-1.8	-7.1	..	..	..
Brazil	Fundação CESP	..	..	..	18.5	12.7	..	..	..	..	9.0	9.0	..
Brazil	Fundação Petrobras	..	..	..	11.9	9.4	..	..	..	..	2.9	5.7	..
Brazil	Fundação Sistel	..	..	..	14.1	8.8	..	..	..	..	4.9	5.2	..
Brazil	Previ	7.1	2.6	-2.6	15.2	14.7	*7.2*	1.1	-3.6	-12.0	5.9	10.9	*0.2*
Brazil	Real Grendeza	..	..	..	24.2	12.2	..	..	..	..	14.2	8.5	..
Brazil	Valia	..	..	..	13.3	10.7	..	..	..	..	4.2	7.0	..
Canada	British Columbia IMC (2)	..	14.2	-0.2	..	..	..	..	12.5	-1.8	..	..	..
Canada	Local Authorities Pension Plan	..	..	..	5.3	10.1	..	..	..	..	3.9	8.4	..
Canada	OMERS	6.0	10.0	..	..	..	..	4.7	8.5	..	..	..	..
Canada	OTPP	10.9	11.8	13.0	4.0	9.7	*9.8*	9.5	10.2	11.2	2.5	8.0	*8.2*
Chile	AFP Cuprum (3,4)	7.6	15.6	6.6	9.2	4.8	*8.7*	4.4	10.4	2.1	5.3	2.6	*4.9*
Chile	AFP Habitat (4)	7.8	..	..	..	..	..	4.6	..	..	..	..	..
Chile	AFP Modelo (4)	..	6.5	13.1	..	..	..	..	1.8	8.3	..	..	..
Chile	AFP Provida	6.8	15.5	..	..	..	..	3.7	10.3	..	..	..	..
Croatia	Allianz ZB obligatory pension fund	..	11.4	5.6	5.7	1.2	..	..	11.9	6.2	6.9	0.1	..
Croatia	Erste Plavi	..	10.1	6.6	8.2	5.0	..	..	10.6	7.3	9.4	3.8	..
Croatia	PBZ CO	5.1	10.2	7.0	8.5	2.4	*6.6*	4.8	10.8	7.7	9.8	1.3	*6.8*
Croatia	Raiffeisen Mandatory Pension Funds	4.2	12.4	6.6	7.3	4.7	*7.0*	3.9	12.9	7.2	8.5	3.5	*7.2*
Denmark	PensionDanmark	..	4.9	4.3	7.1	8.6	..	..	4.5	3.9	6.8	7.4	..
Denmark	PFA Pension	-0.9	15.1	2.2	6.6	..	..	-1.6	14.6	1.8	6.3	..	..
Finland	Ilmarinen	9.8	6.8	..	..	..	..	8.1	6.3	..	..	..	..
Finland	KEVA	7.5	8.7	4.8	7.4	7.7	*7.2*	5.8	8.2	5.1	7.0	6.9	*6.6*
Finland	Varma Mutual Pension Insurance Company	..	7.1	4.2	4.7	7.8	..	..	6.6	4.4	4.3	7.0	..
France	ERAFP	6.5	12.8	4.0	4.9	..	..	5.8	12.7	3.8	4.7	..	..
Hong Kong, China	MPF (5)	..	1.5	-3.6	0.9	22.3	..	..	-3.3	-5.8	-0.3	20.2	..
Iceland	Birta	..	..	..	0.6	7.0	..	..	..	..	-1.1	5.1	..
Iceland	Gildi Pension Fund	..	..	..	-0.9	5.8	..	..	..	..	-2.6	4.0	..
Iceland	Lifeyrissjodur Starfsmanna Rikisins	..	..	..	2.9	7.4	..	..	..	..	1.2	5.6	..
Iceland	Pension Fund of Commerce	..	..	..	0.9	7.6	..	..	..	..	-0.8	5.7	..
Ireland	Bank of Ireland	..	..	..	7.7	-1.2	..	..	..	..	7.7	-1.5	..
Ireland	ESB	..	..	..	6.4	6.1	..	..	..	..	6.4	5.7	..

Country head office	Name of fund or institution	Nominal						Real					
		2013	2014	2015	2016	2017	*5-year annualised*	2013	2014	2015	2016	2017	*5-year annualised*
Indonesia	BPJS Ketenagakerjaan (4)	10.1	10.8	..	..	..	..	1.8	2.3	..	..	..	..
Israel	Makefet (4)	11.5	5.6	2.4	4.0	..	..	9.5	5.8	3.4	4.6	..	..
Israel	Menora-Mivtachim (4)	10.6	7.0	3.6	4.4	..	..	8.6	7.2	4.6	5.0	..	..
Italy	Cometa	3.9	6.4	1.7	1.7	1.9	*3.1*	3.2	6.4	1.6	1.8	0.6	*2.7*
Italy	FONCHIM	6.7	6.5	3.0	3.2	3.2	*4.5*	6.0	6.5	2.9	3.3	2.0	*4.1*
Italy	Fonte	4.3	5.7	2.2	2.2	1.9	*3.3*	3.6	5.7	2.1	2.3	0.7	*2.9*
Japan	Pension Fund Association (4)	24.3	11.3	1.9	2.7	10.5	*9.8*	22.3	8.7	1.8	2.8	9.9	*8.9*
Korea	Samsung Life	..	..	..	1.7	2.0	..	..	..	..	0.7	0.1	..
Lithuania	Swedbank Pensija 2	..	..	..	3.0	3.1	..	..	..	..	2.1	-0.6	..
Lithuania	Swedbank Pensija 3	..	..	..	4.4	4.8	..	..	..	..	3.5	1.1	..
Lithuania	Swedbank Pensija 4	..	..	..	5.8	6.4	..	..	..	..	4.8	2.6	..
Malaysia	Employees' Provident Fund (6)	..	6.8	6.4	5.7	6.9	..	..	3.6	4.3	3.5	2.9	..
Mexico	Afore XXI Banorte	2.2	7.6	..	..	..	..	-1.7	3.4	..	..	..	..
Netherlands	PFZW	3.7	15.5	-0.1	12.0	5.1	*7.1*	2.0	14.7	-0.8	11.6	3.7	*6.1*
Netherlands	PME	..	..		10.3	4.7	..	..	..	..	9.9	3.2	..
Netherlands	PMT	1.1	20.6	2.3	11.0	4.1	*7.6*	-0.6	19.8	1.6	10.6	2.6	*6.6*
Netherlands	Stichting Pensioenfonds ABP	6.2	14.5	2.7	9.5	7.6	*8.0*	4.5	13.7	2.0	9.2	6.1	*7.0*
Nigeria	AES Fund	..	22.7	19.9	12.3	22.0	..	..	13.7	9.4	-3.0	4.7	..
Nigeria	CPFA Fund	18.5	4.4	13.0	23.4	29.5	*17.4*	9.8	-3.3	3.1	6.7	11.1	*5.3*
Nigeria	RSA Fund (7)	15.3	6.0	8.5	..	16.4	..	6.8	-1.8	-1.0	..	-0.1	..
Peru	AFP Integra	..	8.9	5.4	..	..	..	..	5.5	0.9	..	..	..
Portugal	Banco BPI Pension Fund	16.7	7.7	14.7	-1.2	13.0	*10.0*	16.5	8.1	14.2	-1.8	11.5	*9.5*
Portugal	CGD Pensões	..	..		0.9	5.4	..	5.3	5.6	4.6	0.3	4.0	*3.9*
Romania	Azt Viitorul Tau (8)	10.3	6.1	2.4	3.2	4.0	*5.2*	8.6	5.3	3.4	4.8	2.6	*4.9*
Romania	Raiffeisen Acumulare	14.2	9.1	2.8	3.2	3.5	*6.5*	12.4	8.2	3.8	4.8	2.1	*6.2*
Russian Federation	Future (4)	..	..	5.6	4.1	-1.9	..	..	..	-8.6	-2.8	-5.3	..
Russian Federation	Lukoil - Garant (4)	..	..	9.0	8.2	-5.2	..	..	..	-5.7	1.1	-8.6	..
Russian Federation	Sberbank (9)	..	..	10.7	9.4	8.3	..	..	..	-4.2	2.2	4.5	..
Russian Federation	VTB	5.9	4.4	10.4	10.3	..	..	-0.5	-6.2	-4.4	3.1	..	..
South Africa	GEPF (4)	16.0	12.2	4.7	5.6	14.4	*10.5*	10.1	6.5	-0.5	-0.9	8.7	*4.7*
South Africa	Sentinel Retirement Fund (10)	19.7	12.5	11.4	2.4	9.1	*10.9*	13.6	6.8	5.8	-3.9	3.7	*5.0*
Spain	Bankia (11)	7.7	..	..	..	..	..	7.5	..	..	..	..	..
Spain	CCOO	9.0	6.0	2.5	..	..	..	8.7	7.1	2.5	..	..	..
Spain	Endesa	9.4	7.1	3.5	4.0	4.0	*5.6*	9.1	8.2	3.4	4.2	2.0	*5.3*
Spain	Fonditel (12)	4.2	5.8	2.7	1.8	4.8	*3.8*	3.9	7.0	2.6	2.0	2.8	*3.6*
Spain	Santander	7.2	5.9	2.1	2.7	3.6	*4.3*	6.9	7.0	2.1	2.9	1.6	*4.1*
Sweden	Alecta	10.2	..	..	..	..	..	10.0	..	..	..	..	..
Sweden	AP7	..	29.3	6.3	15.2	16.4	..	..	29.7	6.2	14.1	14.4	..
Switzerland	Pensionskasse Post	..	6.8	0.2	3.2	6.1	..	..	7.1	1.5	3.6	5.5	..
Switzerland	Publica	..	..	-1.9	5.1	6.8	..	..	..	-0.8	5.5	6.2	..
Turkey	OYAK	15.3	17.2	..	..	..	..	7.4	8.3	..	..	..	..
United Kingdom	BBC Pension Scheme	..	..	..	25.3	10.0	..	..	..	..	24.0	7.3	..
United Kingdom	RBS Group Pension Fund	..	..	..	29.7	6.8	..	..	..	..	28.4	4.1	..
United Kingdom	USS (5)	12.8	15.1	3.6	20.0	6.1	*11.4*	10.5	14.6	3.4	18.8	3.5	*10.0*
United States	LACERA	15.0	6.7	1.5	8.3	14.9	*9.2*	13.3	5.9	0.8	7.0	12.5	*7.8*
United States	Massachusetts PRIM Board (13)	15.2	8.2	..	..	..	..	13.5	7.4	..	..	..	..
United States	New York City Combined Retirement System (4)	16.1	7.5	..	..	..	..	14.4	6.7	..	..	..	..
United States	Ohio Public Employees Retirement System	13.9	..	..	..	..	..	12.2	..	..	..	..	..
United States	Illinois SURS (14)	17.0	6.5	2.6	0.2	..	..	15.3	5.7	1.8	-1.0	..	..
	Eurocontrol	..	..	..	9.0	5.6	..	..	..	..	6.9	3.4	..

Note: Annual investment rates of return are net-of-fees, unless noted. Real annual investment returns have been calculated using the nominal rate of return and the variation of domestic consumer price index between the ends of each year.

“..” means not available

(1) Returns are for the balanced fund. (2) Reported returns are for years ending March 31, 2015 and March 31, 2016. (3) Returns are provided for the Fund C. (4) Returns are gross-of-fee investment rates of return. (5) Returns reported by the Mandatory Pension Funds are aggregated from 36 member schemes. (6) Real returns for the Employees' Provident Fund, Malaysia were provided by Malaysia which were calculated in relation to their National Statistics data. (7) Before 2014, data refer to DC plans only. From 2014, data refer to DC and DB plans. (8) Data refer to the largest fund managed: Fond de Pensii Administrat Privat AZT Viitorul Tau. (9) Data refer to the largest pension plan (OPS) which accounts for 95% of pension assets of the fund. (10) Data only refer to the Pensioner Portfolio. (11) Data are given for the most representative plan of Bankia Pensiones. (12) Data from 2013 onwards refer to Fonditel's biggest pension plan (Empleados de Telefónica de España). (13) Returns for 2013 and 2014 have been gathered from publicly available sources. (14) Data refer only to DB schemes.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs and publicly available reports.

PART A2 –PUBLIC PENSION RESERVE FUND INVESTMENT PORTFOLIOS

Public pension reserve fund size

The total amount of public pension reserve fund (PPRFs) assets at the end of 2017 was equivalent to USD 7.5 trillion within the countries for which data was received or obtained (Table 3). The largest reserve is held by the US Social Security Trust Fund at USD 2.9 trillion, followed by Japan's Government Pension Investment Fund at USD 1.4 trillion. Korea, China, Canada and Sweden also have accumulated large reserves. Of the countries with public pension reserve funds surveyed, 14 had established their funds since 2000 (inclusive). The United States Social Security Trust Fund is the oldest, established over 75 years ago.

Table 3 also shows three major non-OECD countries that are G20 members: Argentina, China, and India. China's National Social Security Trust Fund reached USD 341.4 billion at the end of 2017. Argentina's fund, founded in 2007, reached USD 64.7 billion. Assets shown for India represent three distinct funds: the Employees' Provident Fund, the Employees' Pension Fund and the Employees' Deposit Linked Insurance Fund, all totalling USD 131.7 billion.

The reserves put aside by PPRFs increased by 6.9% (nominal) on average between 2016 and 2017 (based on local currency values, and weighted by assets). Argentina's Sustainability Guarantee Fund increased by 37.4% since last year. Three other funds showed high growth rates: the New Zealand Superannuation Fund at 17.8%, India's Employee Provident Fund Organisation at 15.5%, and Poland's Demographic Reserve Fund at 14.9%. Spain showed a decline of 46.1%. During 2017, Spain drew on reserves to pay pension benefits and to meet fiscal objectives. Belgium's Zilverfonds (USD 23.5 billion at the end of 2016) was liquidated, with the fund closed in 2017.

In terms of total assets relative to the national economy, Korea had the highest ratio at 33.9% of GDP, followed by Luxembourg at 32.7%, Jordan at 32.2%, Japan at 29.8%, and Sweden at 28.6% (aggregate AP funds). The weighted average of PPRF assets accounted for 18.9% of GDP in the selected countries in 2017.

Large reserves are also accumulated in sovereign wealth funds that have a pension focus. The Government Pension Fund Global in Norway has two main goals: to facilitate government savings necessary to meet the rapid rise in public pension expenditures in coming years, and to support long-term management of petroleum revenues. At the end of 2017, the fund held USD 1.1 trillion in assets, accounting for 266.3% of Norway's GDP. The fund is considered to be the largest sovereign wealth fund in the world. The Russia Federation's National Wealth Fund is dedicated to supporting the pension system to guarantee long-term functioning of the system (see Annex for a description).

Table 11. Total assets of selected PPRFs in 2017

Country head office	Name of the fund or institution	Year of establishment	Total investments or assets (1)		
			USD bn.	% of GDP	% increase (compared to the previous year)
Argentina	Sustainability Guarantee Fund	2007	64.7	11.4	37.4
Australia	Future Fund (2)	2006	108.3	7.7	8.8
Belgium	Zilverfonds (6)	2001	0.0	0.0	-100.0
Bosnia and Herzegovina	Pension Reserve Fund Of Republic of Srpska	2011	0.1	0.7	4.3
Bulgaria	State Fund for Guaranteeing the Stability of the State Pension System	2007	1.7	2.8	4.8
Canada	Canada Pension Plan Investment Board	1997	268.8	15.7	13.1
Canada	Quebec Pension Plan	2006	55.2	3.2	11.3
Chile	Pension Reserve Fund	2006	10.9	3.7	13.0
China (People's Republic of)	National Social Security Fund (2)	2001	341.4	2.7	10.0
Finland	Valtion Eläkerahasto	1997	23.5	8.7	4.3
France	AGIRC - ARRCO (2) and FRR (5)	n.d.	115.0	4.2	-0.8
Germany	Sustainability Fund (Nachhaltigkeitsrücklage) (2)	1972	40.1	1.0	3.3
India	Employees' Provident Fund Organisation (2,4)	1952	131.7	5.1	15.5
Japan	Government Pension Investment Fund	2006	1,440.9	29.8	12.3
Jordan	Social Security Investment Fund (2)	n.d.	12.9	32.2	10.0
Korea	National Pension Fund (2)	1988	580.7	33.9	11.3
Luxembourg	Fonds de Compensation Commun au Régime Générale de Pension (2)	2004	21.7	32.7	6.1
Mexico	IMSS Reserve (7)	n.d.	1.6	0.1	9.5
New Zealand	New Zealand Superannuation Fund	1989	26.8	14.0	17.8
Norway	Government Pension Fund - Norway (GPFN)	2001	29.3	7.3	13.2
Poland	Demographic Reserve Fund	2002	7.2	1.3	14.9
Portugal	Social Security Financial Stabilisation Fund	1977	18.9	8.1	10.7
Spain	Social Security Reserve Fund	1997	9.7	0.7	-46.1
Sweden	National Pension Funds (AP1-AP4 and AP6)	2000	171.8	28.6	6.8
United States	Social Security Trust Fund	1940	2,891.8	14.8	1.5
Total selected countries (8)			**6,374.6**	**18.9**	**6.9**
Memo item: Sovereign Wealth Funds with a pension focus (9)					
Norway	Government Pension Fund - Global (GPFG)	1990	1,068.8	266.3	13.1
Russian Federation	National Wealth Fund (2)	2008	65.2	4.1	-13.9
Total memo items			**1,133.9**		
Total PPRFs and SWFs with a pension focus			**7,508.5**		

(1) Data correspond to all forms of investment with a value associated to a pension fund/plan. 2017 valuations are for year-end, unless otherwise noted. (2) Data have been gathered from publicly available sources. (3) Total investments are the sum of assets of AP1, AP2, AP3, AP4, and AP6. (4) Data refer to the end of March 2017, and include the Employees' Provident Fund, the Employees' Pension Fund and the Employees' Deposit Linked Insurance Fund. (5) Data refer to two funds: AGIRC-ARRCO which announced its intention to merge both plans in 2015, and FRR. (6) Belgium's Zilverfonds was liquidated in 2017. (7) Data only refer to reserves used to pay early retirement due to invalidity or work-related injuries. (8) Weighted average for assets as a % of GDP and % increase. (9) Norway's Government Pension Fund - Global and Russia's National Wealth Fund are sovereign wealth funds and not public pension reserve funds; their mandate goes beyond financing pension expenditures.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs and publicly available reports.

PPRF asset allocation

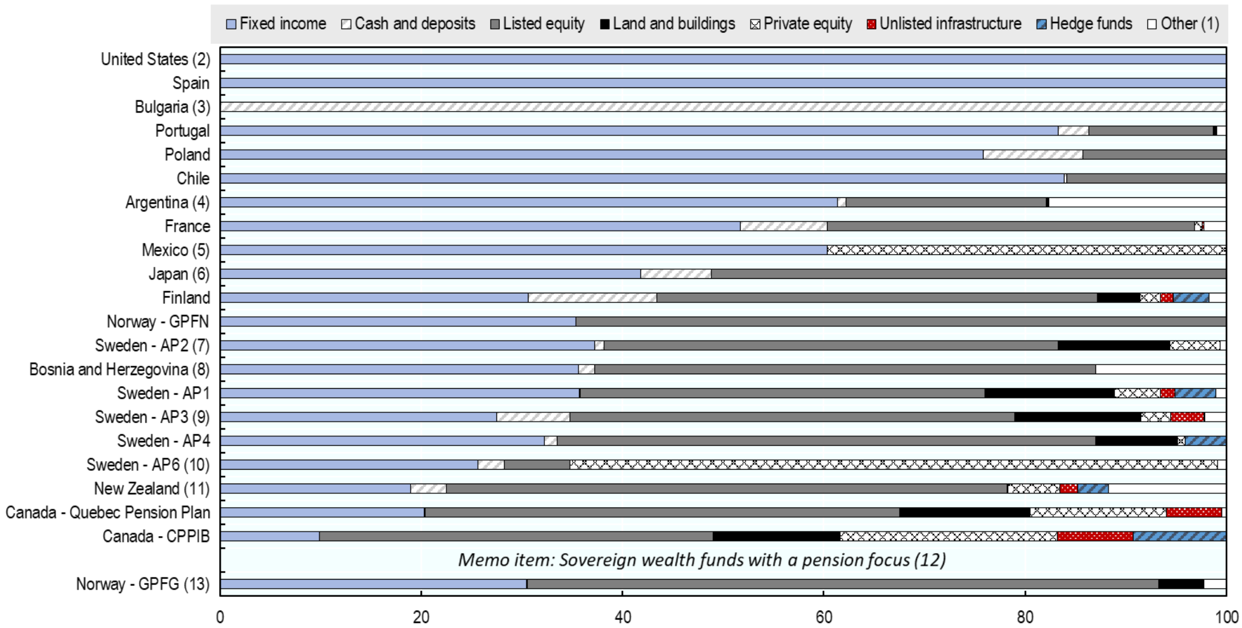
PPRFs have varying mandates and constraints on investment portfolios. Some reserves were established as "buffer funds" to smooth benefit payments of first-pillar pay-as-you-go retirement systems. Finland's Valtion Eläkerahasto is such a fund: pension payments disbursed by the state are included in the government budget to which the fund transfers an amount equivalent to 40 per cent of the annual pension expenditure, and the fund has a funding ratio of 25% of the state's pension liability. Germany's Sustainability Fund (Nachhaltigkeitsrücklage) was designed to smooth short- to medium-term volatility of pension finances. The Australia Future Fund and Canada Pension Plan Investment Board, by contrast, have long-term investment mandates where expected pension payments occur far into the future.

A spectrum of mandates and limits on investment leads to varying investment profiles (Figure 8). Some funds, such as those in Spain and the United States, have statutory limits requiring them to invest only in government bonds (in the case of the United States, special issues of the United States Treasury). In Australia, Canada and New Zealand, long-term mandates lead to a profile more similar to a funded pension scheme (defined benefit fund) with lower allocations to fixed income and higher allocations to return seeking assets, such as alternative investments and equity.

Over the past few years, several PPRFs had to increase liquidity and reduce risk due to fiscal pressures. Major changes in investment strategies took place in Spain and Portugal. Spain's Social Security Reserve Fund migrated nearly all assets to Spanish government bonds in 2014 and has increased cash and liquidity in subsequent years as assets are liquidated and withdrawn. Portugal de-risked the Social Security Financial Stabilization Fund by increasing fixed income allocations and decreasing listed equities and real estate related holdings. Since 2010, Portugal's fund increased fixed income and cash from 65.3% of assets to 86.4% by the end of 2017.

Figure 20. Asset allocation of selected PPRFs – actual 2017

As a percentage of total investment



(1) The "other" category includes loans, commodities and other investments. (2) Assets were invested in interest-bearing securities of the U.S. Government for purchase exclusively by the Social Security Trust Fund (special issues). (3) Assets of the State Fund for Guaranteeing the Stability of the State Pension System were held in weekly deposits at the Bulgarian National Bank. (4) Other instruments include listed infrastructure investments. (5) Data only refer to reserves used to pay early retirement due to invalidity or work-related injuries. The asset allocation of IMSS changed between 2012 and 2013, mainly in private equity, as a result of the increase in the Afore investment. Since 1997, IMSS invested in Afore XXI, which in 2012 merged their operations with Afore Banorte and became Afore XXI Banorte. In March 2013, with the acquisition of Afore BBVA Bancomer, the institutional investment in Afore XXI Banorte increased as well. (6) Data is gathered from a publicly available report. Alternative investments are classified as domestic bonds, domestic stocks, foreign bonds, or foreign stocks. At year end 2017 the fund reported 0.21% of the total portfolio was invested in alternatives. (7) Derivatives are reported at fair value as "other investments". Any cash backing these derivatives is included and reported as "Cash and deposits". Unsettled transactions, accrued interest and dividends are reported as "Other investments". (8) Other investments include investment in unregistered instruments and local companies. (9) Other investments include long/short portfolios, opportunistic asset allocation, derivatives, convertibles, insurance-linked securities, volatility strategies, and risk premia strategies. (10) Sweden's AP6 is a closed fund that specialises at investing in unlisted assets. (11) Other investments include timberlands, farmland, insurance-linked securities, and derivatives. (12) Norway's Government Pension Fund - Global is a Sovereign Wealth Fund and is not a Public Pension Reserve Fund, because its mandate goes beyond financing pension expenditures. (13) Other investments include financial derivatives, unsettled trade receivables, lending (repo).

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs and publicly available reports.

Other funds have moved in the opposite direction and have reduced fixed income and cash and increased exposures to return seeking assets. In fact, the general trends in asset allocation over the past four years confirm that PPRFs are on average shifting investment from fixed income to equities and alternatives (see executive summary). Japan's Government Pension Investment Fund invested 77.9% in fixed income and cash, and 22.1% in listed equities in 2010. By the end of 2017, the fund had invested 49.9% of assets in fixed income and cash and 51.1% in listed equities. The shift reflects a new policy asset mix effective in 2014 of 50% fixed income, and 50% listed equities. This policy also includes the ability to invest up to 5% in alternative investments, along with deviation limits in the four main asset categories of domestic equities, domestic bonds, foreign equities and foreign bonds.

The simple average portfolio for the PPRFs included in the survey shows that 54.0% of total assets were invested in fixed income and cash, 30.5% in listed equities, and 15.5% in alternative/other investments. Norway's GPFN had the highest allocation to listed equity at 64.6% of total assets.

Alternative investments in PPRF portfolios include hedge funds, real estate, unlisted infrastructure, private equity, and other categories such as natural resources. At the end of 2017, New Zealand's Superannuation Fund invested 21.8% of total assets in alternatives/other, including investments in timberlands and farmland. The Canada Pension Plan Investment Board allocated 21.5% of the total portfolio to private equity at the end of 2017. CPPIB also reported sizeable investments in other alternative asset categories, with 51.0% of the total portfolio invested in alternatives, the highest by far of all PPRFs. The Swedish funds AP2, AP3 and AP4 have all increased their allocations to alternatives over the past few years. Sweden's AP6, a closed fund, specialises in investing in unlisted assets, with 64.3% of the total portfolio reported in private equity. PPRFs also invest in infrastructure assets mainly through listed and unlisted equity (see Part B), with funds in Canada having the largest allocations.

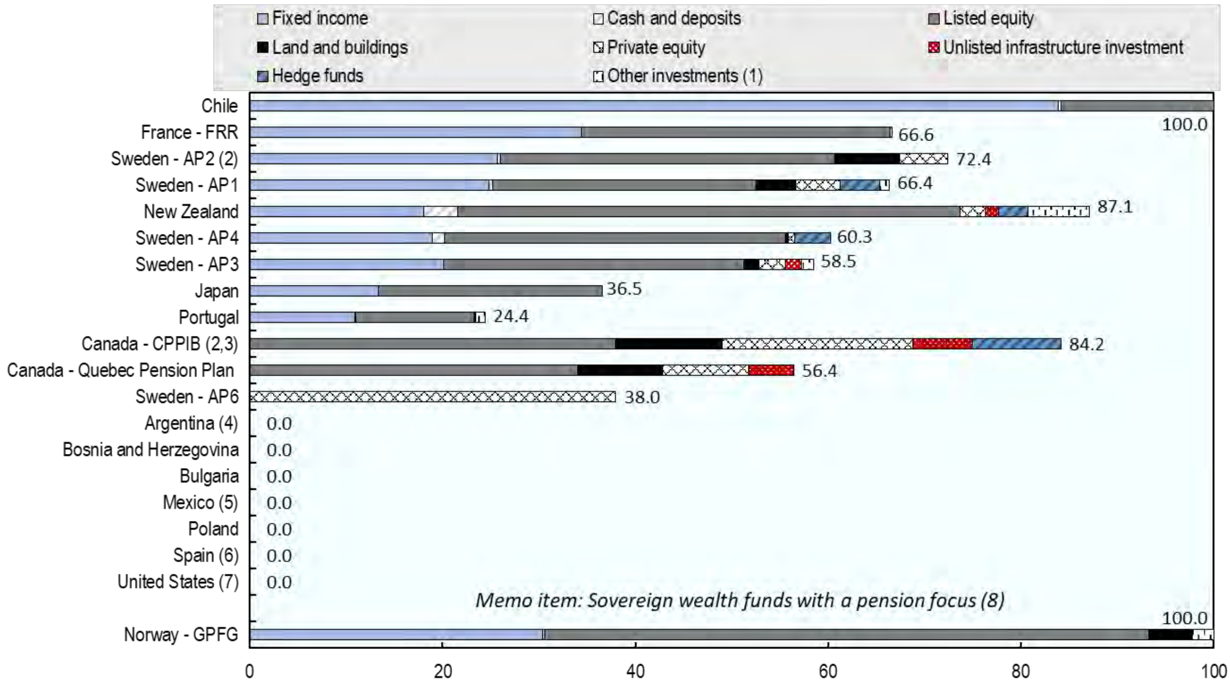
PPRF foreign investment

With some major exceptions, the majority of funds maintain exposure to foreign markets through both equity and fixed income instruments (Figure 9). Some funds also invest in foreign alternatives. Chile's entire portfolio was fully invested abroad, including equities in developed and emerging markets. Norway's Government Pension Fund – Global, which receives petroleum revenues (which are transacted in USD), invested all assets in foreign markets. Six additional funds invested over 60% of total assets in foreign markets.

CPPIB invested 46.2% of the total portfolio in overseas alternatives, and had a high allocation to private equity and real estate (19.8% and 11.1%, respectively). The Quebec Pension Plan also invested a significant amount in foreign alternatives, allocating 22.4%. Portugal's reserve fund invested smaller amounts in foreign markets – investment in foreign fixed income and equities were concentrated in North America. A total of seven funds reported zero exposure to foreign assets.

Figure 21. Foreign investment by asset class in selected PPRFs in 2017

As a percentage of total (i.e. domestic and foreign) investment



(1) The "other" category includes loans, commodities, and other investments. (2) Cash and deposits and/or other investments have been excluded because they were negative in 2017. (3) Foreign exposures in fixed income and cash and equivalents may be distorted due to long and short balances. (4) Foreign investments prohibited. (5) Data only refer to reserves used to pay early retirement due to invalidity or work-related injuries. (6) The Spanish Social Security Reserve Fund stopped investing in foreign assets (government bonds) in July 2014. (7) Assets were invested in interest-bearing securities of the U.S. Government for purchase exclusively by the Social Security Trust Fund (special issues). (8) Norway's Government Pension Fund - Global is a Sovereign Wealth Fund and is not a Public Pension Reserve Fund, because its mandate goes beyond financing pension expenditures.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

PPRF performance – Investment rates of return in local currency

2017 delivered positive returns to most PPRFs – on average PPRFs are invested more conservatively than LPFs. With strong equity performance in 2017, portfolios invested predominately in fixed income and cash somewhat lagged peers that were diversified across return-seeking assets like equities. For funds with wider investment mandates, owing to variation in domestic equity market performance, diversification by funds across foreign markets and into alternative asset classes helped performance.

All PPRFs that returned questionnaires posted positive nominal and real returns in 2017, with the exception of Spain's Social Security Reserve Fund. A few reported exceptionally strong returns. Funds based in Canada continued several years of above-average returns. New Zealand's Superannuation Fund returned 17.6% real in 2017. Argentina's high nominal returns over the past few years are due to high levels of inflation. The simple average fund return was 9.3% nominal, 6.2% real in 2017 (excluding Argentina where real returns were not available).

Annualised five-year real returns, which capture results from 2013 to 2017, were positive for all funds that reported data. New Zealand returned an impressive 14.6% real, annualised. Other funds that had diversified portfolios such as Sweden AP1-AP4 and AP6, the Canadian reserve funds, and Australia's Future Fund all had strong five-year annualised real returns.

Table 12. Nominal and real annual investment rates of return of selected PPRFs 2011-2017
In percentage

Country	Name of the fund or institution	Nominal						Real					
		2013	2014	2015	2016	2017	*5-year annualised*	2013	2014	2015	2016	2017	*5-year annualised*
Selected countries													
Argentina	Sustainability Guarantee Fund (1)	33.8	43.3	40.0	31.8	37.4	*37.2*	..	..	..	..	..	..
Australia	Future Fund (2)	17.2	13.2	8.4	7.8	8.8	*11.0*	14.1	11.3	6.6	6.4	6.7	*9.0*
Belgium	Zilverfonds (3)	4.0	3.7	3.2	3.1	..	..	3.0	4.1	1.6	1.1	..	..
Bosnia and Herzegovina	Pension Reserve Fund of Republic of Srpska	6.0	5.7	5.4	-15.4	2.1	*0.4*	6.1	6.7	6.4	-14.5	0.9	*0.8*
Canada	Canada Pension Plan Investment Board	13.5	15.6	16.0	4.2	11.6	*12.1*	12.1	13.9	14.1	2.7	9.9	*10.5*
Canada	Quebec Pension Plan	15.3	12.3	10.5	8.0	10.7	*11.4*	13.9	10.7	8.8	6.5	9.0	*9.7*
Chile	Pension Reserve Fund	10.5	17.7	12.8	-2.1	2.0	*7.9*	7.2	12.5	8.1	-5.7	-0.2	*4.2*
Finland	Valtion Eläkerahasto	6.4	7.8	4.9	6.7	6.5	*6.5*	4.7	7.3	5.1	6.3	5.7	*5.8*
France	AGIRC - ARRCO (4,5)	..	..	..	..	3.5	..	..	..	..	..	2.4	..
France	FRR	..	..	..	5.0	7.2	..	..	..	..	4.8	6.1	..
Japan	Government Pension Investment Fund (4)	17.1	9.2	1.8	2.0	11.0	*8.1*	15.2	6.7	1.7	2.1	10.5	*7.1*
Korea	National Pension Service (4)	4.2	5.3	4.6	4.8	7.3	*5.2*	3.0	4.4	3.4	3.8	5.2	*4.0*
Luxembourg	FCCRGP (4,6)	5.6	11.0	3.5	5.3	3.8	*5.8*	4.0	11.6	2.4	5.0	2.0	*5.0*
Mexico	IMSS Reserve (7)	4.6	4.7	4.2	5.0	7.7	*5.2*	0.6	0.6	2.0	2.1	1.5	*1.4*
New Zealand	New Zealand Superannuation Fund	26.1	13.9	6.5	13.2	19.8	*15.7*	24.1	13.0	6.4	12.5	17.6	*14.6*
Norway	Government Pension Fund - Norway	15.6	10.6	6.9	7.0	13.2	*10.6*	13.3	8.4	4.5	3.3	11.1	*8.0*
Poland	Demographic Reserve Fund	3.0	4.0	-0.1	2.6	6.0	*3.1*	2.3	5.0	0.5	3.3	3.8	*3.0*
Portugal	Social Security Financial Stabilisation Fund	6.9	14.7	3.6	-0.6	8.9	*6.6*	6.7	15.2	3.1	-1.2	7.4	*6.1*
Spain	Social Security Reserve Fund (8)	9.1	11.9	1.1	0.9	-0.1	*4.4*	8.9	13.0	1.0	1.1	-2.0	*4.2*
Sweden	AP1	11.2	14.6	4.0	9.3	9.6	*9.7*	11.0	15.0	3.9	8.2	7.7	*9.1*
Sweden	AP2	12.7	13.1	4.0	10.3	9.0	*9.8*	12.5	13.5	3.9	9.2	7.1	*9.2*
Sweden	AP3	14.1	13.7	6.8	9.4	8.8	*10.5*	13.9	14.1	6.7	8.3	6.9	*9.9*
Sweden	AP4	16.4	15.7	6.8	10.0	9.1	*11.5*	16.2	16.1	6.7	8.9	7.2	*11.0*
Sweden	AP6 (9)	9.2	6.5	12.2	6.5	12.3	*9.3*	9.1	6.8	12.1	5.5	10.3	*8.7*
United States	Social Security Trust Fund	3.8	3.6	3.4	3.2	3.0	*3.4*	2.3	2.8	2.6	1.9	0.8	*2.1*
Memo item: Sovereign Wealth Funds with a pension focus (10)													
Norway	Government Pension Fund - Global	15.9	7.5	2.7	6.9	13.6	*9.2*	13.6	5.3	0.3	3.2	11.5	*6.7*

Note: Real net investment returns have been calculated using the nominal rate of return and the variation of the end-of-period consumer price index between the ends of each year.

".." means not available.

(1) Real returns were not available; returns for 2016 and 2017 are gross-of-fees. (2) Returns for 2016 and 2017 are from publicly available sources. (3) Belgium's Zilverfonds was liquidated in 2017. (4) Data has been gathered from publicly available sources. (5) AGIRC and ARRCO are unfunded mandatory supplementary plans for white-collar and blue-collar workers respectively, with reserves; the funds announced their intent to merge in 2015. (6) Fonds de Compensation Commun au Régime Générale de Pension. (7) Data only refer to reserves used to pay early retirement due to invalidity or work-related injuries. (8) Investment returns are gross-of-fees. (9) Data before 2016 has been gathered from publicly available sources. (10) Norway's Government Pension Fund - Global is a Sovereign Wealth Fund and not a Public Pension Reserve Fund, because its mandate goes beyond financing pension expenditures.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs and publicly available reports.

PART B – INFRASTRUCTURE INVESTMENT

Table 13. Detailed infrastructure investment of selected LPFs and PPRFs, 2017

As a percentage of total assets

Country head office	Name of the fund or institution	Total investments in 2017 (in USD m.)	Infrastructure investment (as a % of total investments)		
			Unlisted equity	Listed equity	Debt
LPFs					
Australia	AustralianSuper	101,162	9.9	..	0.6
Australia	CBUS	33,910	8.9	0.4	..
Australia	Hostplus Superannuation fund	22,640	10.0	..	..
Australia	Unisuper	48,694	3.5	..	..
Brazil	Banesprev	4,993	0.3	..	..
Brazil	FAPES - BNDES	3,232	0.8	..	3.6
Brazil	FORLUZ	4,558	1.6	0.2	..
Brazil	Fundação Petrobras	21,681	3.0	..	..
Brazil	Fundação Sistel	5,111	0.3	..	..
Brazil	Previ	56,687	5.1	..	..
Brazil	Real Grandeza	4,565	1.3	..	..
Brazil	Valia	6,701	0.3	..	1.1
Canada	Alberta Investment Management Company (AIMCo)	82,613	7.6	..	..
Canada	Local Authorities Pension Plan	34,019	8.4	..	..
Canada	OTPP	147,750	10.1	..	..
Denmark	PensionDanmark	34,354	9.7	..	..
Denmark	PFA Pension	76,949	1.2	..	..
Finland	Keva	62,209	0.8	0.2	0.3
Finland	Varma Mutual Pension Insurance Company	54,347	0.6	..	..
Germany	BASF Pensionskasse	11,408	4.7	..	2.6
Iceland	Gildi Pension fund	4,923	0.4	..	..
Iceland	Lifeyrissjodur Starfsmanna Rikisins	7,869	0.2	0.6	1.8
Iceland	Pension Fund of Commerce	6,366	0.8	3.7	2.6
Ireland	Bank of Ireland	6,320	1.0	6.0	..
Ireland	ESB	4,542	4.8	..	..
Japan	Pension Fund Association	109,053	0.5	..	..
Netherlands	PFZW	236,479	3.8	..	..
Netherlands	PMT	83,377	0.7	..	..
Netherlands	Stichting Pensioenfonds ABP	545,464	2.4	..	..
Netherlands	Stichting Pensioenfonds van de Metalektro (PME)	55,887	0.8	..	2.2
Portugal	CGD Pensões (1)	3,179	1.7	2.0	..
Romania	Azt Viitorul Tau	2,216	..	10.7	..
South Africa	GEPF	152,812	1.2	..	..
Spain	Endesa	2,092	0.3	5.8	6.1
Spain	Fonditel (2)	3,931	0.7	..	..
Switzerland	Pensionskasse Post	17,361	2.5	..	..
Switzerland	Publica	40,427	..	..	0.9
United Kingdom	USS (3)	87,060	8.7	0.4	1.7
	Eurocontrol	1,888	5.2	..	..
PPRFs					
Argentina	Sustainability Guarantee Fund	64,655	..	..	7.8
Canada	Canada Pension Plan Investment Board	268,763	7.5	..	..
Canada	Quebec Pension Plan	55,227	5.5	..	..
Chile	Pension Reserve Fund	10,858	..	3.0	4.4
Finland	Valtion Eläkerahasto	23,479	1.2	..	..
France	FRR	43,724	0.1	..	..
New Zealand	New Zealand Superannuation Fund	26,837	1.7	0.7	..
Sweden	AP1	40,511	1.4	..	..
Sweden	AP3	42,055	3.3	0.7	..
Sweden	AP4	43,453	..	4.7	..

".." means not available.

(1) Data cover the CGD Staff's Pension Fund. (2) Data refer to Fonditel's biggest pension plan: Empleados de Telefónica de España. (3) Data are as of March 2018.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

Part B of this report presents an analysis of the quantitative and qualitative data on infrastructure investments gathered from large pension funds and public pension reserve funds. A total of 49 funds, accounting for USD 2.8 trillion in AUM, reported an allocation to infrastructure investments, either in the form of unlisted infrastructure equity, listed equity, or debt. Although about half of funds surveyed stated they are actively investing in infrastructure as shown in Table 5, these total allocations are not comparable, as they relate to different forms of investment. Infrastructure investments can be classified along three primary dimensions based on types of financial instruments, capital market exposure, and vehicles, with survey questions designed to capture all of these elements:

- equity and debt investments (describes the type of economic exposure to infrastructure assets);
- direct exposure, mainly through private market (unlisted) equity (investment in project equity and infrastructure funds that invest in project equity) and debt (such as project bonds or loans); and,
- indirect investment through listed corporate shares or corporate bonds, or vehicles such as mutual funds and trust funds that invest in shares of infrastructure corporations or in projects.

Diversification, liquidity, capital requirements, pricing frequency, and amount of control over the investment can all vary through the different methods of investing in infrastructure, and can serve differing investment objectives in a fund's long-term strategic asset allocation.

Analysis of infrastructure allocations in the total portfolio

Of the 49 funds that indicated investment in infrastructure assets, 44 reported exposure to unlisted infrastructure assets,[14] and 20 had dedicated target allocations to the asset category (see Table 6). Most funds that reported a target allocation were underweight, indicating that there is capacity for investors to increase investment levels in unlisted infrastructure equity.

Pension funds with a dedicated allocation are more likely to have a target allocation to the asset class as part of their long-term strategic asset allocation, and are more likely to invest through unlisted equity instruments (infrastructure funds or direct investment).

Three superannuation funds based in Australia, AustralianSuper, CBUS, and Hostplus all reported high allocations to unlisted infrastructure equity: 9.9%, 8.9%, and 10.0%, respectively. Australia has well established capital markets for infrastructure finance, and superannuation funds, which are defined contribution savings plans for retirement, have been active participants. OTPP, based in Canada, also reported a large allocation to infrastructure at 10.1% of the total portfolio; PensionDanmark reported 9.7%.

PFZW in the Netherlands reported 3.8% allocated to unlisted infrastructure equity; USS in the United Kingdom reported 8.7%. Funds in Iceland, responding to the survey for the first time, reported investment levels in infrastructure under one percent.

[14] Due to rounding, it may appear that some funds reported a zero percent allocation in Table 5.

Table 14. Infrastructure investment in 2017 – portfolio allocation

As a percentage of total assets

Country head office	Name of fund	Infrastructure allocation	Where does it fit in the portfolio allocation	Invest in greenfield projects	Actual allocation to unlisted infrastructure (2017) (% of total assets)	Most recent reported target asset allocation to unlisted infrastructure (if separate) (% of total
LPFs						
Australia	AustralianSuper	Separate	Infrastructure	No	9.9	..
Australia	CBUS	Separate	Infrastructure	Considering	8.9	..
Australia	Hostplus Superannuation fund	Separate	Infrastructure	Yes	10.0	..
Australia	Unisuper	Non-separate	..	Yes	3.5	..
Brazil	Banesprev	Non-separate	..	No	0.3	..
Brazil	FAPES - BNDES	Non-separate	Private equity, equity	No	0.8	..
Brazil	FORLUZ	Non-separate	Private equity, equity	No	1.6	..
Brazil	Fundação Petrobras	Non-separate	Equity	No	3.0	..
Brazil	Fundação Sistel	Non-separate	..	No	0.3	..
Brazil	Previ	Non-separate	Equity	Yes	5.1	..
Brazil	Real Grandeza	Non-separate	Private equity	No	1.3	..
Brazil	Valia	Non-separate	Private equity	Yes	0.3	..
Canada	Alberta Investment Management Company (AIMCo)	Separate	Infrastructure	..	7.6	8.4
Canada	Local Authorities Pension Plan	Separate	Infrastructure	..	8.4	15.0
Canada	OTPP (1)	Non-separate	Real assets - Infrastructure	Yes	10.1	..
Denmark	PensionDanmark (2)	Separate	Infrastructure	Yes	9.7	10.0
Denmark	PFA Pension (2,3)	Non-separate	Private equity, equity, fixed income	No	1.2	..
Finland	Keva	Non-separate	Private equity	No	0.8	..
Finland	Varma Mutual Pension Insurance Company (2)	Non-separate	..	No	0.6	..
Germany	BASF Pensionskasse	Separate	Alternative assets, infrastructure	Yes	4.7	6.0
Iceland	Gildi Pension fund	Non-separate	Private equity	..	0.4	..
Iceland	Lifeyrissjodur Starfsmanna Rikisins	Non-separate	Equity	No	0.2	..
Iceland	Pension Fund of Commerce	Non-separate	..	No	0.8	..
Ireland	Bank of Ireland	Separate	Infrastructure	No	1.0	3.0
Ireland	ESB	Separate	Infrastructure	No	4.8	4.0
Japan	Pension Fund Association	Separate	Infrastructure	No	0.5	1.0
Netherlands	PFZW	Separate	Infrastructure	Yes	3.8	4.2
Netherlands	PMT	Separate	Real estate	No	0.7	1.0
Netherlands	Stichting Pensioenfonds ABP	Separate	Infrastructure	Yes	2.4	3.0
Netherlands	Stichting Pensioenfonds van de Metalektro (PME)	Separate	Infrastructure	Yes	0.8	..
Portugal	CGD Pensões (2,4)	Non-separate	..	No	1.7	..
South Africa	GEPF	Non-separate	Private equity	Yes	1.2	..
Spain	Endesa	Separate	Infrastructure	No	0.3	..
Spain	Fonditel (2,5)	Non-separate	Private equity	Yes	0.7	..
Spain	Santander	Separate	Infrastructure	..	0.2	2.0
Switzerland	Pensionskasse Post	Separate	Infrastructure	Yes	2.5	4.0
Switzerland	Publica	Separate	Infrastructure debt	Yes	0.9	3.5
United Kingdom	USS (2,6)	Separate	Infrastructure	Yes	8.7	5.0
	Eurocontrol	Separate	Infrastructure	No	5.2	7.5
PPRFs						
Argentina	Sustainability Guarantee Fund (2,7)	Separate	Infrastructure	No	..	5.0-20.0
Bosnia and Herzegovina	Pension Reserve Fund Of Republic of Srpska	Non-separate	Infrastructure / Real estate	..	0.0	5.0
Canada	Canada Pension Plan Investment Board (8)	Separate	Infrastructure	Yes	7.5	..
Canada	Quebec Pension Plan	Separate	Infrastructure	..	5.5	8.0
Finland	Valtion Eläkerahasto (2)	Separate	Infrastructure	Yes	1.2	2.0
France	FRR	Non-separate	..	..	0.1	..
New Zealand	New Zealand Superannuation Fund	Non-separate	Infrastructure, private equity	..	1.7	..
Sweden	AP1 (2)	Separate	Infrastructure	..	1.4	5.0
Sweden	AP3 (2)	Non-separate	Real estate, other	Considering	3.3	..

".." means not available.

(1) Separate allocation to infrastructure was reclassified to real assets in 2016. (2) Data partially based on previous years' questionnaires. (3) PFA Pension is a defined contribution scheme, thus a target allocation does not exist at the fund level. (4) Data cover the CGD Staff's Pension Fund. (5) Data refer to Fonditel's biggest pension plan: Empleados de Telefónica de España. (6) Data are as of March 2018. (7) Argentina's Sustainability Guarantee Fund invests in infrastructure through private debt instruments. (8) CPPIB has a target infrastructure allocation at a total fund level; however, there is no specific target allocation within the different infrastructure security types.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

For funds without a separate allocation to infrastructure, investment in such assets may be included in real estate or private markets categories. A number of funds based in Brazil reported exposure to unlisted infrastructure equity (eight in total, out of nine Brazilian funds surveyed). This provides a good indication about how funds in Brazil invest in infrastructure as the population is relatively large compared to the overall institutional investor landscape. These eight funds reported unlisted infrastructure equity investment, yet they categorise investment as part of private equity or equity exposure, and did not indicate a separate allocation to infrastructure investments.

In the event that a fund invests in listed instruments, infrastructure investments may be categorised in listed equities or fixed income as a result of passive investments in public securities, or part of active portfolios.[15] Depending on the composition of industries in local bond and equity markets, infrastructure-related issues may be a large component of overall market capitalisation, as is the case in some developing countries.

Institutional investors seem to prefer more stable investment profile of brownfield assets, although there is increasing evidence that funds are considering greenfield assets either as direct investors, or hiring investment managers that are skilled at investing in assets during the construction phase. About half of funds reported interest in greenfield investments[16] (19 "yes or considering" versus 20 "no"). Risk, and prospective returns, are higher in greenfield assets and may require more due diligence on the part of the investor.

Institutional investors have positioned infrastructure in the holistic asset allocation with different objectives, keeping in mind the unique risk/return characteristics. For Varma Mutual, infrastructure investments are part of private equity investments, without any target allocation. KEVA reported that infrastructure is included as part of alternative investments, with no separate allocation. Several funds reported regulatory obstacles to investing in infrastructure, notably in Chile and Romania. Sixteen funds that did report exposure to infrastructure stated that they planned to adopt an infrastructure allocation in the near future. LACERA, based in the United States, began investing in infrastructure for the first time in 2018, opening a 3% target allocation. Three funds based in Lithuania also opened new allocations in recent years (after 2017). The following are some examples of asset allocation and portfolio investments in infrastructure from specific investors:

- GEPF: Based in South Africa, invests in economic and social infrastructure funds as part of an investment category named developmental investments. These investments aim at contributing to sustainable development within South Africa and worldwide, while meeting the fund's primary goal of safeguarding members' and pensioners' benefits.

- ERAFP: Based in France, included infrastructure investments in its "diversification pocket", together with private equity, amongst others. The fund also reported that it is not likely to increase the allocation to infrastructure and private equity dramatically in the years to come, given the current investment environment in which it operates, as there are regulatory constraints regarding notably the investment vehicles ERAFP is allowed to invest in. In terms of investment allocation to specific sectors within infrastructure, the fund reported a preference for keeping a diversified approach and to avoid excessive concentrations.

Analysis of infrastructure investment levels

Overall investment in infrastructure in 2017 was still limited: if we consider total assets under management of funds from which data was received (i.e. 99 funds for USD 9.0 trillion) infrastructure investment in the

[15] Several funds indicated that they would consider moving infrastructure investments to a dedicated allocation as investments mature, or as they see opportunities arise.

[16] Defined as those investments bearing construction and development risks.

form of unlisted equity and debt considered as direct, was USD 120.8 billion, representing 1.3% of the total assets under management of the entire survey population.

Looking more in detail at the 49 funds taken into consideration for this part of the survey, total investment in infrastructure at the end of 2017, considered as direct exposure (USD 120.8 billion), represented 4.3% of total assets of these 49 funds (Table 7). On average, those funds that do investment in infrastructure have built up moderate levels.

Unlisted equity (i.e. infrastructure funds or direct investments in projects) is the largest category of infrastructure investment at USD 110.5 billion, and 3.9% of total assets in Part B. This amount is higher than in previous years, however, changes in the survey population do not make these figures directly comparable. CPPIB had the largest portfolio of unlisted infrastructure equity, in absolute terms, at USD 20.2 billion, followed by OTPP at USD 14.9 billion, and AustralianSuper at USD 10.1 billion.

There is potential capacity to expand institutional investment in infrastructure. Target allocations amongst the funds with dedicated exposure ranged on the low end from 1% to 20% of total assets. All but two funds that reported a separate target allocation to infrastructure were below targets at the end of 2017 (see Table 6). Nineteen funds that do not currently invest in infrastructure indicated that they planned to open allocations in the future, including funds based in Croatia, Lithuania, Sweden, and the United States. The Pension Reserve Fund of the Republic of Srpska reported a new 5.0% allocation to infrastructure and real estate, which was not yet funded at the time of this data collection.

Table 15. Infrastructure investment in 2017

	Total assets, in USD millions	As a % of total assets of funds in Part B of the report (1)	As a % of total assets for all funds (2)
Unlisted Equity	110,466	3.9	1.2
Debt	10,368	0.4	0.1

(1) Infrastructure investment is calculated as a percentage of total assets of funds investing in infrastructure. (2) Infrastructure investment is calculated as a percentage of total assets of all funds in the survey, excluding the ones stemming from publicly available reports.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

A few other funds indicated possible interest, but cited regulatory constraints on investments as barriers. For example, the Mandatory Provident Fund System in Hong Kong, China, which is a defined contribution system of privately managed funds, only permits investment in listed markets such as shares and bonds. AFP Cuprum, based in Chile, cited liquidity and regulatory constraints as barriers to investment. A fund in Romania also cited regulatory constraints as barriers to infrastructure investment. A fund in Nigeria cited sponsor constraints. One fund in Brazil indicated that high levels of risk prevented them from investing.

Infrastructure debt

Despite the difficulties of measuring debt investment in infrastructure, often reported in other asset classes by investors, the survey clearly outlines high activity and some interesting new trends in this category which can include publicly traded debt instruments or direct project loans, senior and/or mezzanine loans, and bonds.

Debt exposure to infrastructure for the subsample for part B was USD 10.4 billion or 0.4% of total assets in 2017 (Table 7). Of the funds surveyed, 13 reported exposure to direct loans and bonds. The Swiss fund Publica reported 0.9% allocated to infrastructure debt, which comprised a loan portfolio diversified across transportation, energy, and social infrastructure. KEVA, based in Finland, reported debt instruments issued by corporations in the utility industry. Two funds based in Brazil, FAPES-BNDES and Valia reported exposure to infrastructure debt; FAPES-BNDES had previously reported that its exposure was through debentures of companies in the infrastructure sector, telecommunications, and energy.

Argentina's Sustainability Guarantee Fund, one of the only PPRFs to report exposure to direct infrastructure fixed income, reported 7.8% allocated to loans and bonds. Reported in previous surveys, financial trusts and structured finance transactions were the main financing vehicles for Argentina's debt investments in infrastructure. The fund is required by statute to invest at least 5%, and up to 20%, of the total portfolio in domestic infrastructure projects.

Some green bonds may also be included as infrastructure investment. Investment in green bonds has increased amongst the survey population (see Part C on green investments). Some of these debt instruments back clean water and energy projects which could fall under the category of infrastructure.

Analysis of infrastructure portfolios

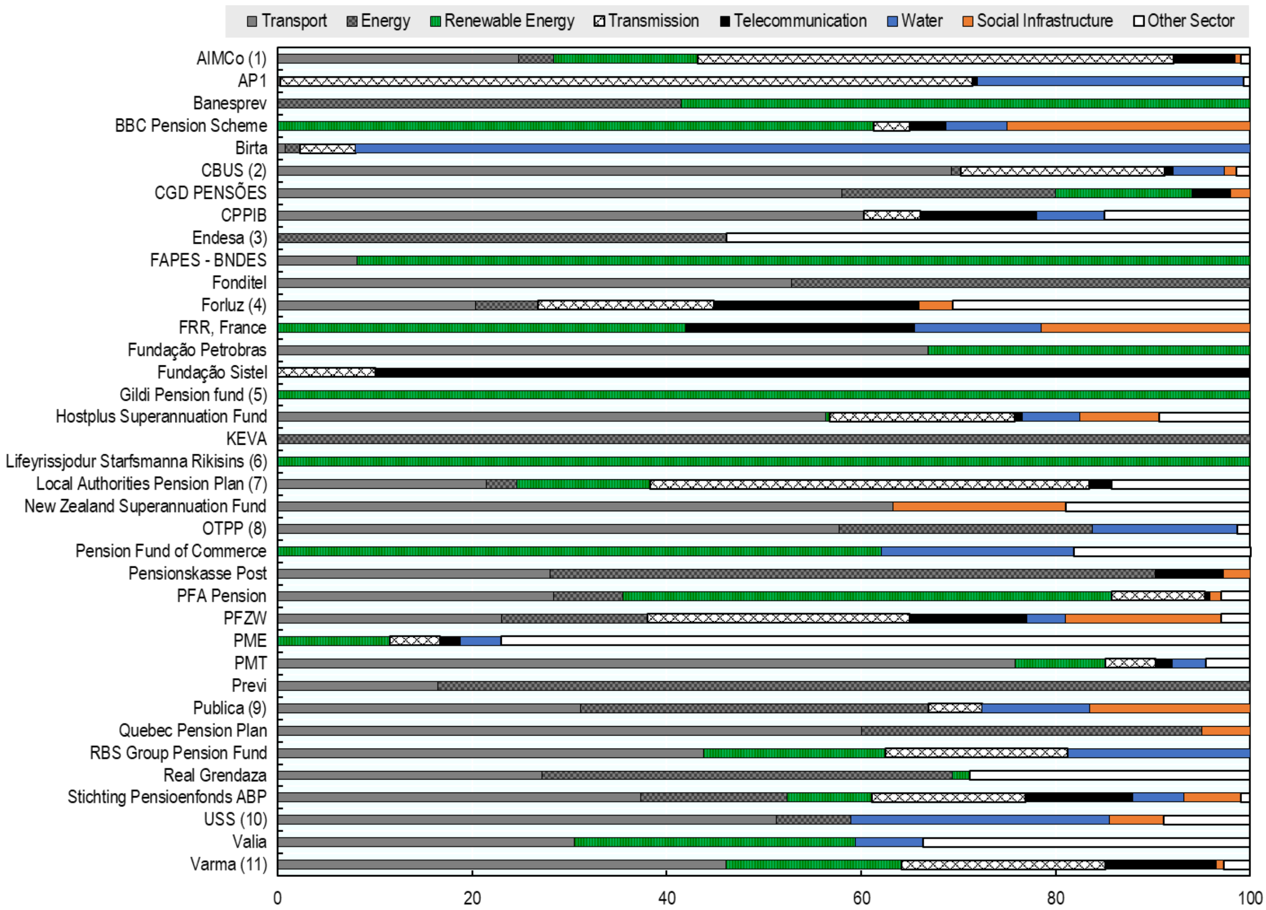
Amongst funds that reported the sector allocations of their unlisted infrastructure equity portfolios, transportation was the largest component, with the average fund investing 28.6%, followed by renewable energy with an average of 20.0% (Figure 10).

Survey results show widely varying investment levels by pension funds in the various sectors, yet most funds were diversified. This data provides evidence that pension funds are significant investors in renewable energy and that they have actively been financing the energy transition. Two funds based in Iceland reported investments in geothermal energy and heat, which occupied 100% of their reported infrastructure allocation. Funds in the United Kingdom including the BBC Pension Scheme and RBS Group Pension Fund reported sizeable allocations to renewables: RBS has financed onshore wind energy, while BBC has financed solar, onshore, and offshore wind investments. A number of Brazilian pension funds also reported sizeable allocations to renewables including Banesprev, FAPES-BNDES, Petrobras, and Valia.

BBC Pension Scheme and FRR both had significant allocations to social infrastructure. Birta, based in Iceland, reported 92.0% of unlisted equity was allocated to water investments.

Figure 22. Infrastructure sector allocations of selected LPFs and PPRFs in 2017

As a percentage of total unlisted infrastructure equity investment



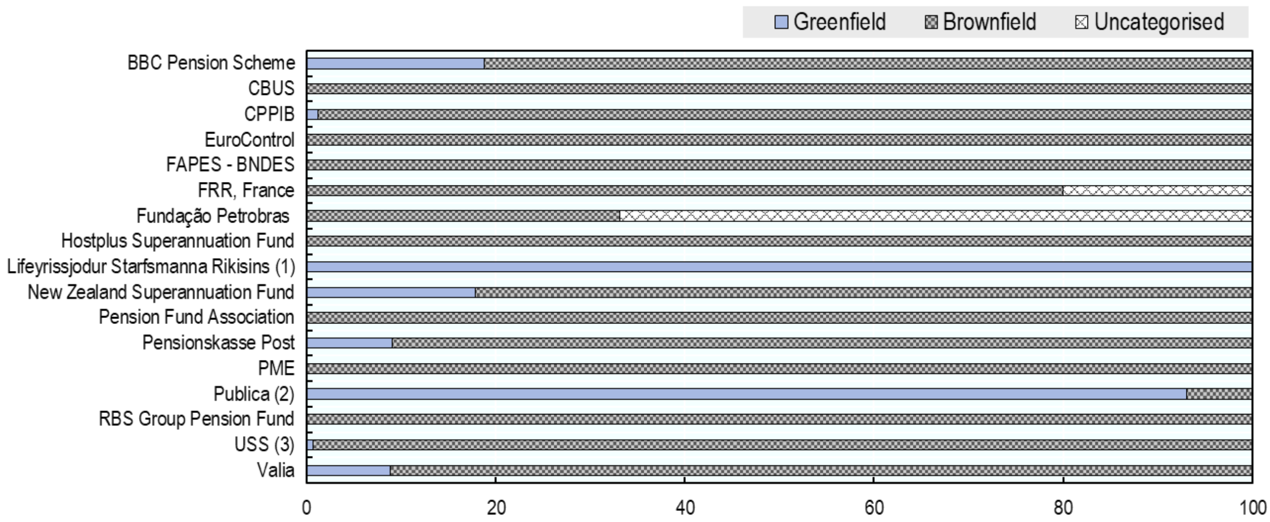
(1) AIMCo reported allocations for only a portion of the total portfolio. (2) Includes land titles. (3) Other includes multi-sector infrastructure. (4) Other includes healthcare related investments; includes public and private infrastructure. (5) Hydro and geothermal energy. (6) Geothermal heat. (7) Other includes timberlands, waste management. (8) Energy includes generation and transmission. (9) Allocations are for a loan portfolio. (10) Data are as of March 2018. (11) Allocations are as of December 2016.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

While a number of funds are expressing greater interest in investing in greenfield assets (see Table 6 where funds indicated whether they invest or plan to invest), few funds reported existing investment in greenfield assets, with some exceptions (Figure 11). Fore instance, Lifeyrissjodur Starfsmanna Rikisins, based in Iceland, reported 100.0% of their unlisted equity was invested in greenfield assets, likely linked to geothermal heat in cross reference to Figure 10. Publica, based in Switzerland, reported 93.1% in greenfield investment, which consisted of infrastructure loans, likely at construction stage. Four other funds reported exposure to greenfield investments, all under 20.0% of unlisted equity investment.

Figure 23. Infrastructure allocations, by development phase, for selected LPFs and PPRFs in 2017

As a percentage of total unlisted infrastructure equity investment



(1) Geothermal heat. (2) Allocations are for a loan portfolio. (3) Data are as of March 2018.

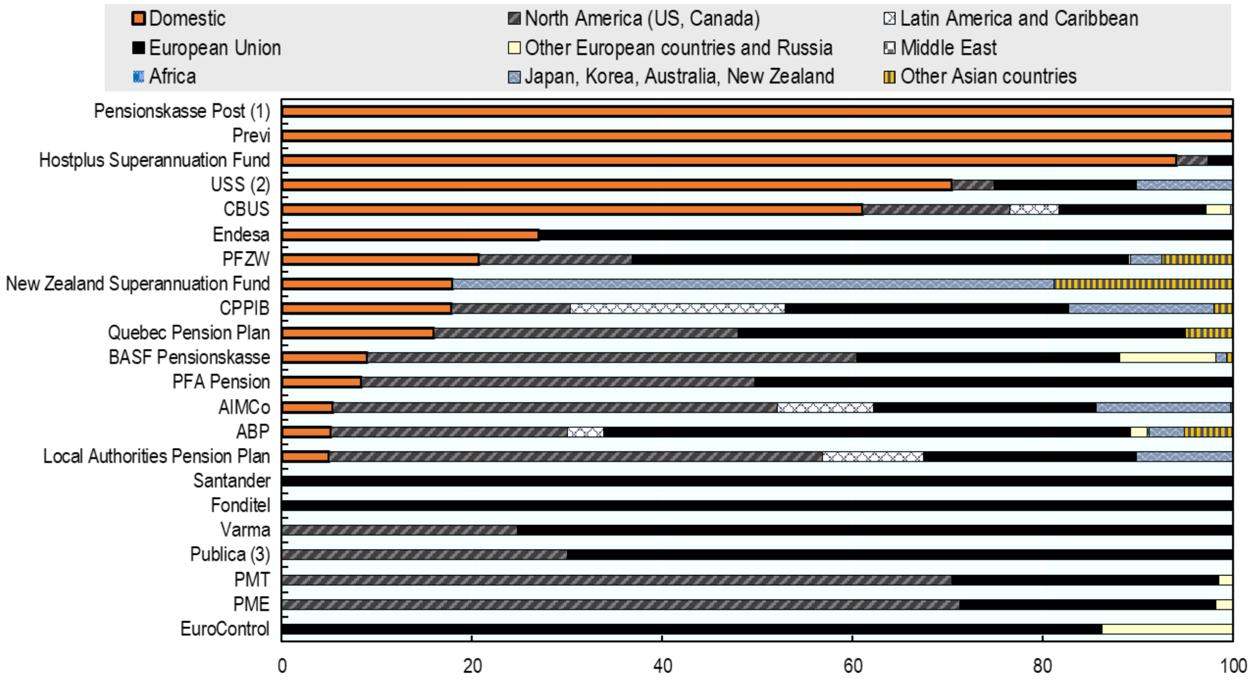
Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

Twenty-two funds reported the geographical distribution of their unlisted infrastructure equity portfolio (Figure 12). This sample reveals low levels of investment in emerging markets, in general. No funds reported exposure in Africa, and only one fund reported exposure to the Middle East, though at de minimis levels. The New Zealand Superannuation Fund, two funds based in the Netherlands: ABP and PFZW, and the Quebec Pension Plan, reported exposure to infrastructure in emerging Asian countries. Three Canadian funds, CPPIB AIMCo, and LAPP, reported noteworthy allocations in Latin America.

Some funds also had a strong home-market bias. Funds based in Australia such as Hostplus and CBUS had comparatively larger investments domestically than abroad. Two funds invested only domestically: Previ in Brazil, and Pensionskasse Post in Switzerland. North America and the European Union were the two regions where most investment occurred by the funds in Figure 12.

Figure 24. Infrastructure allocations, by geographic region, for selected LPFs and PPRFs in 2017

As a percentage of total unlisted infrastructure equity investment



(1) Data are as of December 2016. (2) Data are as of March 2018. (3) Allocations are for a loan portfolio.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

Analysis of infrastructure investment vehicles

The majority of funds indicated that they invest in unlisted equity through funds, with some notable observations amongst regions and countries (Table 8), although both methods of investment are widely utilised in this survey population.

Of the funds that broke out their allocations in Table 8, unlisted infrastructure funds accounted for 61.8% of the total, direct and co-direct investments 38.2%, and other unlisted investments were 0% of the total, on average. Australian superannuation funds used a mix of investment funds and direct/co-direct investments, with a slight tilt toward investment funds. Funds based in Europe, particularly those based in Spain, Ireland, Germany, and the Netherlands tended to use funds rather than direct investment. Canadian funds favoured direct and co-investments in unlisted equity. Funds based in Iceland reported direct investments in infrastructure.

A variety of fund structures to access infrastructure are available, including closed- and open-ended. Data on infrastructure funds shows high activity in 2017. According to Preqin, 69 unlisted infrastructure funds reached financial close in 2017, securing an aggregate USD 65.4 billion in capital commitments.[17]

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[17] Preqin (2017), Global Infrastructure Report, Sample pages.

Table 16. Detailed infrastructure investment vehicles of selected LPFs and PPRFs, 2017

As a percentage of total unlisted infrastructure equity investment

Country head office	Name of the fund or institution	Total unlisted infrastructure equity in 2017 (in USD m.)	Unlisted infrastructure investment breakdown (as a % of total unlisted infrastructure investments) (1)		
			Unlisted infastructure funds	Direct and co-investment infrastructure equity	Other unlisted infrastructure equity
LPFs					
Australia	CBUS	3,026	89.4	10.6	0.0
Australia	AustralianSuper	10,051	51.6	48.3	0.1
Australia	Hostplus Superannuation fund	2,258	77.4	22.6	0.0
Australia	UniSuper	1,688	100.0	0.0	0.0
Brazil	Banesprev	13	100.0	0.0	0.0
Brazil	FAPES - BNDES	27	88.3	11.7	0.0
Brazil	Forluz	73	100.0	0.0	0.0
Brazil	Fundação Petrobras	661	0.0	100.0	0.0
Brazil	Fundação Sistel	16	100.0	0.0	0.0
Brazil	Previ	2,904	0.0	100.0	0.0
Brazil	Real Grandeza	57	100.0	0.0	0.0
Brazil	Valia	21	100.0	0.0	0.0
Canada	Local Authorities Pension Plan	2,848	10.5	89.5	0.0
Canada	OTPP	14,934	0.0	100.0	0.0
Denmark	PFA Pension	957	100.0	0.0	0.0
Finland	KEVA	512	41.9	58.1	0.0
Finland	Varma Mutual Pension Insurance Company	311	100.0	0.0	0.0
Germany	BASF Pensionskasse	535	89.6	10.4	0.0
Iceland	Gildi Pension fund	22	0.0	100.0	0.0
Iceland	Lifeyrissjodur Starfsmanna Rikisins	13	0.0	100.0	0.0
Iceland	Pension Fund of Commerce	52	0.0	100.0	0.0
Ireland	Bank of Ireland	61	100.0	0.0	0.0
Ireland	ESB	218	100.0	0.0	0.0
Japan	Pension Fund Association	529	0.0	100.0	0.0
Netherlands	PFZW	8,911	24.9	75.1	0.0
Netherlands	PMT	564	100.0	0.0	0.0
Netherlands	ABP	13,096	39.8	60.2	0.0
Netherlands	PME	461	100.0	0.0	0.0
South Africa	GEPF	1,813	100.0	0.0	0.0
Spain	Endesa	5	100.0	0.0	0.0
Spain	Fonditel (2)	26	100.0	0.0	0.0
Switzerland	Pensionskasse Post	440	100.0	0.0	0.0
United Kingdom	BBC Pension Scheme	1,081	100.0	0.0	0.0
United Kingdom	RBS Group Pension Fund	1,081	0.0	100.0	0.0
United Kingdom	USS (3)	7,602	6.0	94.0	0.0
	EuroControl	98	100.0	0.0	0.0
PPRFs					
Canada	CPPIB	20,192	0.2	99.8	0.0
Canada	Quebec Pension Plan	3,051	0.0	100.0	0.0
Finland	Valtion Eläkerahasto	293	100.0	0.0	0.0
France	FRR	48	100.0	0.0	0.0
New Zealand	New Zealand Superannuation Fund	461	36.8	63.2	0.0
Sweden	AP1	583	2.8	97.2	0.0
Sweden	AP3	1,387	100.0	0.0	0.0

(1) Totals may not add to 100 due to rounding. (2) Data refer to Fonditel's largest pension plan: Empleados de Telefónica de España. (3) Data are as of March 2018.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

PART C – ESG AND INFRASTRUCTURE

Sustainability frameworks

A section of the survey included some questions on green investments by LPFs and PPRFs, which provides a source of quantitative data, and also provides insights as to how investors define more broadly sustainable investment and what may be categorised as "green". Environmental, social, and governance (ESG) frameworks are increasingly becoming important components of institutional investment programmes. These trends are impacting the investment landscape in infrastructure as investors are demanding greater transparency and information regarding investment impact.

Based on data gathered through the survey, it becomes evident that there are neither uniform interpretations underlying sustainability including green and social investment, nor standardised implementation strategies amongst the funds. In some cases, institutional investors are evolving their investment frameworks to align their investment activities with broader environmental or development objectives such as the United Nations Sustainable Development Goals (SDGs), or environmental issues more broadly as part of their investment framework and/or thematic investment strategy. Funds are also adjusting to new regulations in some markets that seek to clarify the role of ESG in a fund's investment process.

Not all funds have reported actively implementing ESG frameworks in their investment processes. Twenty-six LPFs stated that they are not active in green finance. Others are in the process of evaluating their investment programmes. AustralianSuper is currently researching green bonds to add to their socially aware fund option. Fundação CESP (Brazil) is studying to apply ESG methodologies in the next two years.

Ten PPRFs reported activities related to sustainability in investment programmes. Two reserve funds, the Pension Reserve Fund (Chile) and GIPF (Japan) reported barriers to incorporate green and social strategies due to the institutional structure of the funds or regulatory framework conditions.

Increasing relevance of the SDGs

ABP, based in the Netherlands, reported on the importance of the SDGs in their investment framework, and has created a methodology to identify, measure, and report on sustainable development investments (SDIs), which it defines as investment opportunities that contribute to the achievement of the SDGs. The methodology has been implemented since 2017. ABP also indicated that its SDI meet the fund's financial risk and return requirements. PFZW, also based in the Netherlands, reported that their investment policy related to the SDGs focuses on seven areas, namely climate change, water scarcity, healthcare, food security, human rights, corporate governance and a sustainable financial system. PME (Netherlands) reported intentions to set a total portfolio target of 10% in SDIs by 2021.

Green investment

A number of funds reported allocations to green investments (Table 9). Funds based in Austria, France, the Netherlands, and Sweden reported sizeable allocations to green equities. Twenty-three funds reported investments in green bonds – highlighting the general increase observed in the amount of pension funds that invest in green bonds. AP2 reported a 1% allocation to green bonds as part of its long-term strategic allocation. Strong issuance in the green bond market has helped funds increase their allocations. AP2 reported 6.1% allocated to alternative green asset classes. The following are some examples provided by funds that responded to the questions on sustainability and green investment:

- AIMCo, based in Canada, also deploys varying sustainability strategies for each of its asset classes (i.e. public and private equity, real estate and infrastructure). Sustainability strategies are part of

AIMCo's overarching responsible investment policy, which contains sustainability guidelines describing the types of ESG considerations taken into account across the investment process. For example, AIMCo has adopted sustainability guidelines for real estate, infrastructure and timber, and private equity. While there is no pre-determined target allocation for green investment, AIMCo tracks the percentage of their investments in renewable energy and overall renewable exposure, as well as climate-change related impact.

- FRR, based in France, implements green investments through considering several green factors in their allocation decision, such as low carbon indexes, environmental technology, infrastructure, clean technology and the management of environmental issues, both for listed and non-listed investments. Furthermore, FRR targets a CO2 emissions reduction of 50% in its listed equities mandates.

Table 17: Detailed green investments of selected LPFs and PPRFs in 2017

As a percentage of total investment

Country head office	Name of the fund or institution	Total investments in 2017 (in USD m.)	Green investments (as a % of total investments)				
			Green equity	Green bonds	Alternative green asset classes (1)	Other green investments	Total Green Investments
Australia	UniSuper Management Pty Ltd	48,694	4.2	0.3	0.7	..	5.2
Australia	Hostplus Superannuation Fund	22,640	..	..	..	1.5	1.5
Austria	VBV Pensionskasse AG	7,879	14.5	..	..	0.2	14.6
Belgium	EuroControl	1,888	4.3	4.7	..	..	9.0
Brazil	Banesprev	4,993	0.2	..	..	..	0.2
Brazil	Fundação Petrobras	21,681	..	..	..	0.3	0.3
Brazil	Previ	56,687			0.0	..	0.0
Brazil	Valia	6,701	3.7		0.2	..	4.0
Canada	AIMCo	82,613	0.4	0.0	..	..	0.5
Canada	Local Authorities Pension Plan	34,019	0.5	..	..	..	0.5
Canada	OTPP	147,750	..	..	0.9	..	0.9
Denmark	PFA Pension	76,949	0.5	..	1.1	..	1.6
Finland	Varma Mutual Pension Insurance Company (2)	54,347	17.0	0.7	..	..	17.7
France	FRR	43,724	18.1	0.6	0.2	..	18.9
Germany	BASF Pensionskasse	11,408	2.6	..	..	..	2.6
Iceland	Gildi Pension Fund	4,923	..	0.9	0.4	..	1.3
Iceland	Lifeyrissjodur Starfsmanna Rikisins	7,869	0.2	1.8	..	..	1.9
Japan	Pension Fund Association	109,053	..	0.1	..	..	0.1
Netherlands	PFZW	236,479	3.5	0.9	2.1	..	6.5
Netherlands	PME	55,887	36.2	0.4	0.9	..	37.5
Netherlands	PMT	83,377	33.0	0.3	0.2	..	33.6
Netherlands	Stichting Pensioenfonds ABP	545,464	1.1	1.0	1.2	4.4	7.7
New Zealand	New Zealand Superannuation Fund	26,837	..	..	..	6.2	6.2
Nigeria	RSA Fund	6,850	..	0.1	..	..	0.1
Norway	Government Pension Fund - Global	1,068,774	0.8	0.1	..	..	0.9
Romania	Azt Viitorul Tau	2,216	..	..	..	0.2	0.2
South Africa	GEPF	152,812	..	0.3	..	..	0.3
Spain	Endesa	2,092	..	0.6	..	..	0.6
Spain	Fonditel (3)	3,931	1.5	1.3	0.1	..	2.9
Spain	Santander	313	..	1.2	..	..	1.2
Sweden	Alecta	101,095	43.5	2.1	..	21.5	67.1
Sweden	AP1	40,511	..	0.5	..	..	0.5
Sweden	AP2	42,000	1.6	1.5	5.8	3.4	12.5
Sweden	AP3	42,055	..	3.9	0.1	0.0	4.0
Sweden	AP4	43,453	13.4	1.3	..	..	14.7
Sweden	AP7	51,061	..	0.1	0.2	..	0.4
United Kingdom	USS (4)	87,060	..	..	0.1	..	0.1

".." means not available, or zero.

(1) The alternative green asset classes can include hedge funds, natural resources, private equity, infrastructure, and inflation-linked bonds. (2) All direct equity investments are "green", since invests are made under Varma's climate policy. (3) Data refer to Fonditel's largest pension plan: Empleados de Telefónica de España. (4) Data are as of March 2018.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

Social investment

The OECD has gathered for the fourth year data on social impact investments by LPFs and PPRFs, provided in Table 10. The results show that some funds have committed capital to finance organisations or projects with the explicit expectation of a measurable social, as well as financial return; this also includes investment that contributes to the general public benefit. The survey grouped investments into two primary categories: social impact investments (for example social impact bonds) and venture capital/SME finance that is specifically targeted to have a demonstrable social benefit (such as local market development).

Pensionskasse Post, based in Switzerland, reported a 1.2% allocation to microfinance, which it had labelled as an investment with a positive social impact. The GEPF, based in South Africa, has a developmental investment portfolio allocation, which comprises 5% of the overall portfolio and consists of investments in economic and social infrastructure, renewable energy, and agriculture. The following are some examples provided by funds that responded to the questions on sustainability and social investment:

- PFZW (Netherlands) reported that the fund allocates a share of their investment with the goal to generate societal added value. This addresses four themes: solutions for climate change, water scarcity, healthcare and food security.

- PME stated that a goal of their investment policy regarding social impact is to prevent its investments from having any negative social impact and, where possible, to provide social benefits. PME looks to invest in solutions for social problems with measurable impact, on the condition it also provides an acceptable financial return. PME reported four themes in this regard: the energy transition, access to finance, waste management, and affordable housing.

Table 18: Detailed social investments of selected LPFs and PPRFs in 2017 as a share of total investment

As a percentage of total investment

Country head office	Name of the fund or institution	Total investments in 2017 (in USD m.)	Social investments (as a % of total investments)			
			Social/development impact venture capital/SME finance	Social impact bonds/Development impact bonds	Other social investments	Total social investments
Austria	VBV Pensionskasse AG	7,879	..	..	0.3	0.3
Argentina	Sustainability Guarantee Fund (1)	64,655	..	4.0	..	4.0
Brazil	Valia	6,701	..	..	0.4	0.4
Denmark	PFA Pension	76,949	0.5	..	..	0.5
France	FRR	43,724	..	..	18.3	18.3
Iceland	Pension Fund of Commerce	6,366	0.3	..	..	0.3
Netherlands	PMT	83,377	0.9	..	..	0.9
Netherlands	Stichting Pensioenfonds ABP	545,201	0.6	0.3	2.3	3.2
Netherlands	PME	55,887	1.1	..	..	1.1
New Zealand	New Zealand Superannuation Fund	26,837	..	..	0.4	0.4
South Africa	GEPF	152,812	1.2	..	..	1.2
Spain	Fonditel (2)	3,931	..	..	1.0	1.0
Sweden	AP2	42,000	0.1	0.1		0.2
Switzerland	Pensionskasse Post	17,361	..	..	1.2	1.2
United Kingdom	USS (3)	87,060	..	..	0.5	0.5

".." means not available, or zero.

(1) Investments include social infrastructure. The Sustainability Guarantee Fund invests for both financial and social returns. (2) Data refer to Fonditel's largest pension plan: Empleados de Telefónica de España. (3) Data is as of March 2018.

Source: OECD calculations based on responses to the OECD Survey of LPFs and PPRFs.

Survey Annex - Types of sovereign and public pension reserve funds

Although there is no single widely accepted definition, Sovereign and Public Pension Reserve Funds (SPFs) could be defined as funds set up by governments or social security institutions with the objective of contributing to finance the relevant pay-as-you-go pension plans. There are two types of SPFs. Although both have the same ultimate objective (i.e. meeting the potential financial liabilities relating to the social security system), they vary in terms of funding sources, investment strategies, and payout phases, among others.

- One is the fund that is part of the overall social security system, where the inflows are mainly surpluses of employee and/or employer contributions over current payouts, as well as top-up contributions from the government via fiscal transfers and other sources. Among others, Denmark's Social Security Fund, Japan's Government Pension Investment Fund, and USA's Social Security Trust Fund fall within this category. These funds may be managed by the social security institution itself or an independent -often public sector- fund management entity.

- The other type refers to those funds which are established directly by the government (completely separated from the social security system), and whose financial inflows are mainly from direct fiscal transfers from the government. Unlike the first type of SPFs, those within this category have been set up by governments to meet future deficits of the social security system. Some are not allowed to make any payouts for decades. All of these funds are under autonomous management entities. Examples include the Australia Future Fund, the New Zealand Superannuation Fund, the Norwegian Government Pension Fund, and the French "Fond de Réserve pour les Retraites". These funds are also sometimes classified as sovereign wealth funds (SWFs). Though they do not all have high foreign investment allocations.

Source: OECD Pension Markets in Focus

www. oecd.org/finance/lti

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